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REPORT ON A WATER POLLUTION SURVEY OF THE TOWNSHIP OF SANDWICH WEST COUNTY OF ESSEX

may, 1973



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Environment

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REPORT ON A WATER POLLUTION SURVEY
OF THE
TOWNSHIP OF SANDWICH WEST
COUNTY OF ESSEX

MAY 1973

DISTRICT ENGINEERS SECTION
SANITARY ENGINEERING BRANCH
DIVISION OF WATER SUPPLY AND POLLUTION CONTROL

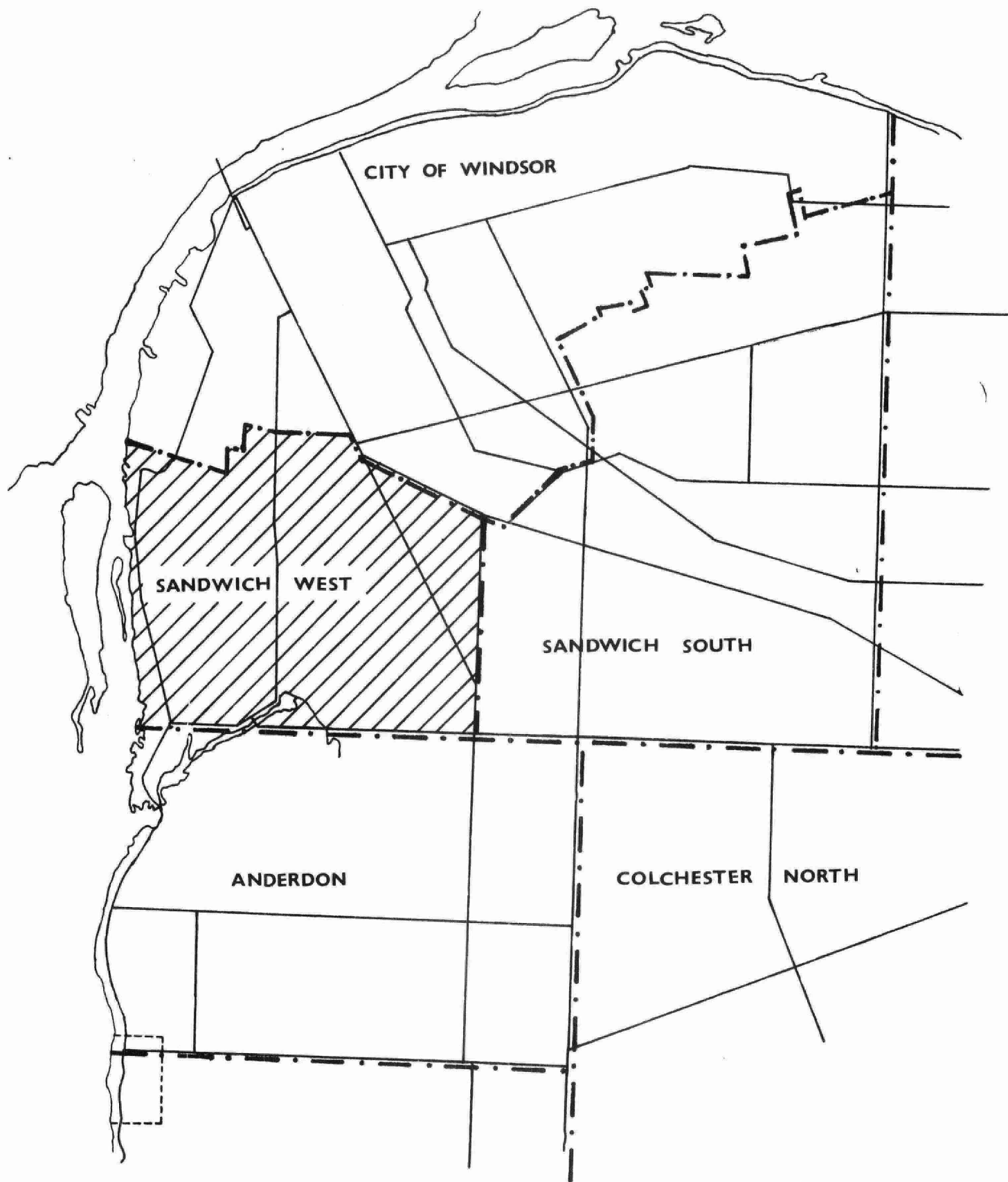


FIGURE # 1

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TOWNSHIP OF SANDWICH WESTWATER POLLUTION SURVEYINTRODUCTION

The Township of Sandwich West is located in the County of Essex, and is bounded on the north by the City of Windsor, on the west by the Detroit River, on the south by the Township of Anderdon and on the east by the Township of Sandwich South.

The Township had a 1972 population of 13,181, making it the largest Township in Essex County and indeed one of the largest in Ontario on a population basis. In 1966, a significant urbanized section of the Township was annexed by the City of Windsor. A substantial urbanized area remained in the Township in the LaSalle and Oliver Project area as well as widespread strip development. Since this time, strip development has continued to escalate in the Township in conjunction with a very rapid growth rate.

It can be assumed that the vast majority of the inhabitants of the Township work in the City of Windsor due to the notable lack of industrial or commercial concerns within the Township.

The main attraction of the Township would appear to be the substantial reduction in taxes combined with the semi-rural atmosphere and the relatively low trip travel time to Windsor.

Historical Background

In 1913, the United States Steel Corporation announced that the former Town of Ojibway had been selected as the site for a Canadian plant. Large areas

of the Township were subsequently subdivided into lots, roads were laid out and sidewalks were constructed far in advance of demand.

War efforts restricted full-scale development of the plant resulting in a much reduced project which eventually closed in 1933 following the depression.

It is within the registered plans of subdivision established during this period that much of the development as it now exists has occurred.

GROWTH AND DEVELOPMENT

The following is a table of population and related functions for the Township of Sandwich West since 1965.

YEAR	POPULATION	POPULATION INCREASE	PERCENT INCREASE
1965	7,890		
1966	8,213	323	4.1
1967	8,397	184	2.2
1968	8,922	525	6.3
1969	9,966	1,044	11.7
1970	10,863	897	9.0
1971	11,822	1,019	9.4
1972	13,181	1,299	10.9

It should be noted that between 1969 and 1972 inclusive, the average annual rate of increase in population has been 10.25 per cent. Between 1971 and 1972, the largest increase in population to date occurred since annexation, with an increase of 1,299 persons representing a 10.9 per cent increment.

The growth rate has continued in spite of repeated warnings that such uncoordinated and inadequately serviced development can only lead to further problems.

Subsequent to the water pollution survey of 1969, the municipality was advised that further development would only aggravate existing water pollution problems and should be curtailed until such time as sanitary collector sewers have been provided.

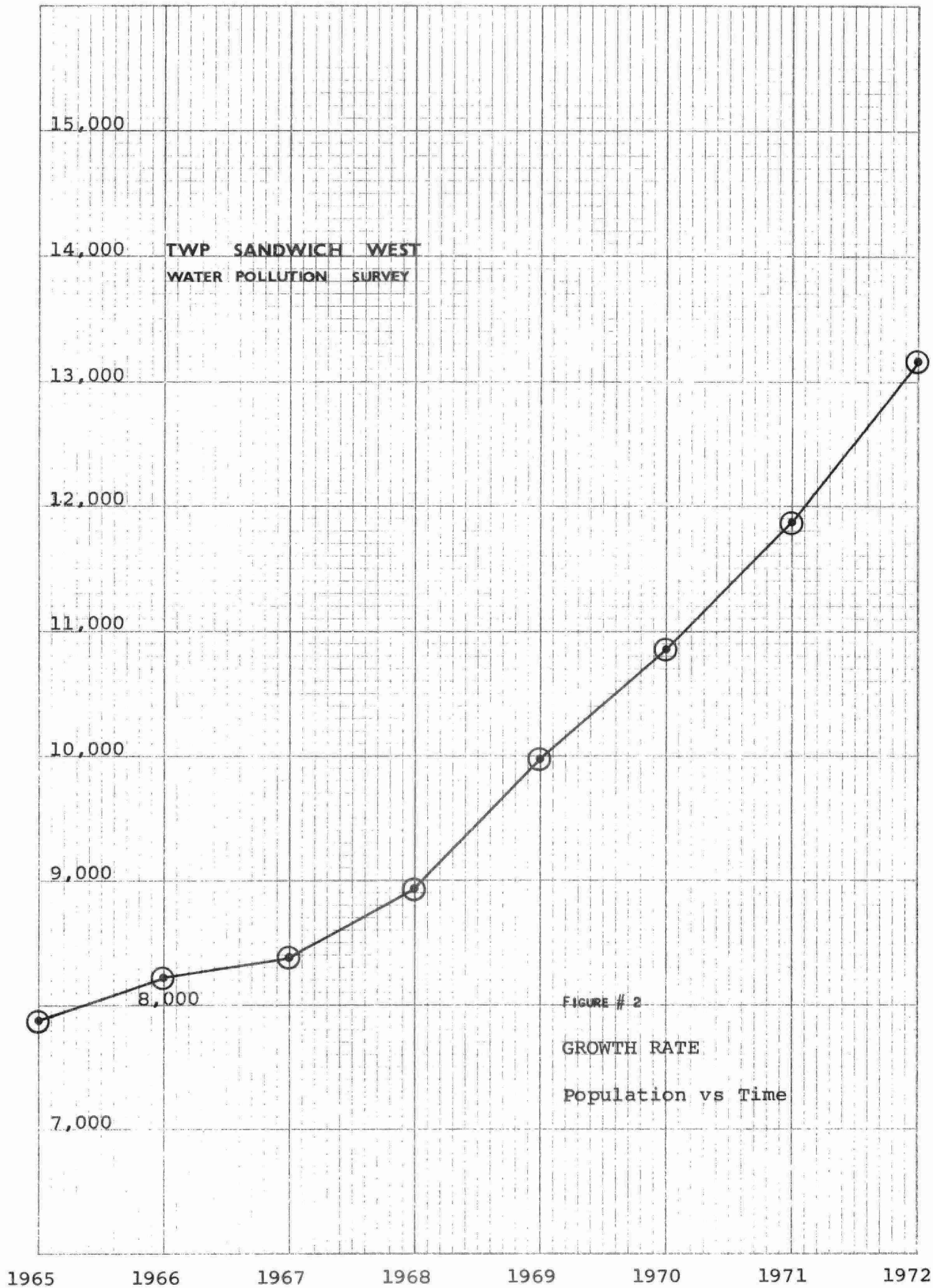
In view of the fact that the most extensive growth has indeed occurred since 1969, the effectiveness of this recommendation is questioned.

The majority of the development within the Township has occurred in the form of strip or ribbon development along the Township roads.

The LaSalle area in the north-west corner of the Township forms the only development of an essentially urban nature combining commercial, and residential uses within a roughly defined area.

Two other pockets of development have occurred; one to the north-east at the junction of Highway 3 and County Road #9, known as the Oliver Project, consisting of approximately 120 homes, the other is located centrally at the northern extent of the township, consisting of a subdivision with approximately 175 homes. These pockets are strictly residential with no known commercial or industrial uses.

Extensive strip development has occurred on virtually every road in the Township. On some roads, such as the east half of Golfview Drive, the housing has been developed essentially as one project, with the entire strip being built within a very short period of time. In other areas, such as Broderick Road, development has occurred by infilling over an extended period of time with essentially the same end result.



TOWNSHIP OF SANDWICH WEST

WATER POLLUTION SURVEY

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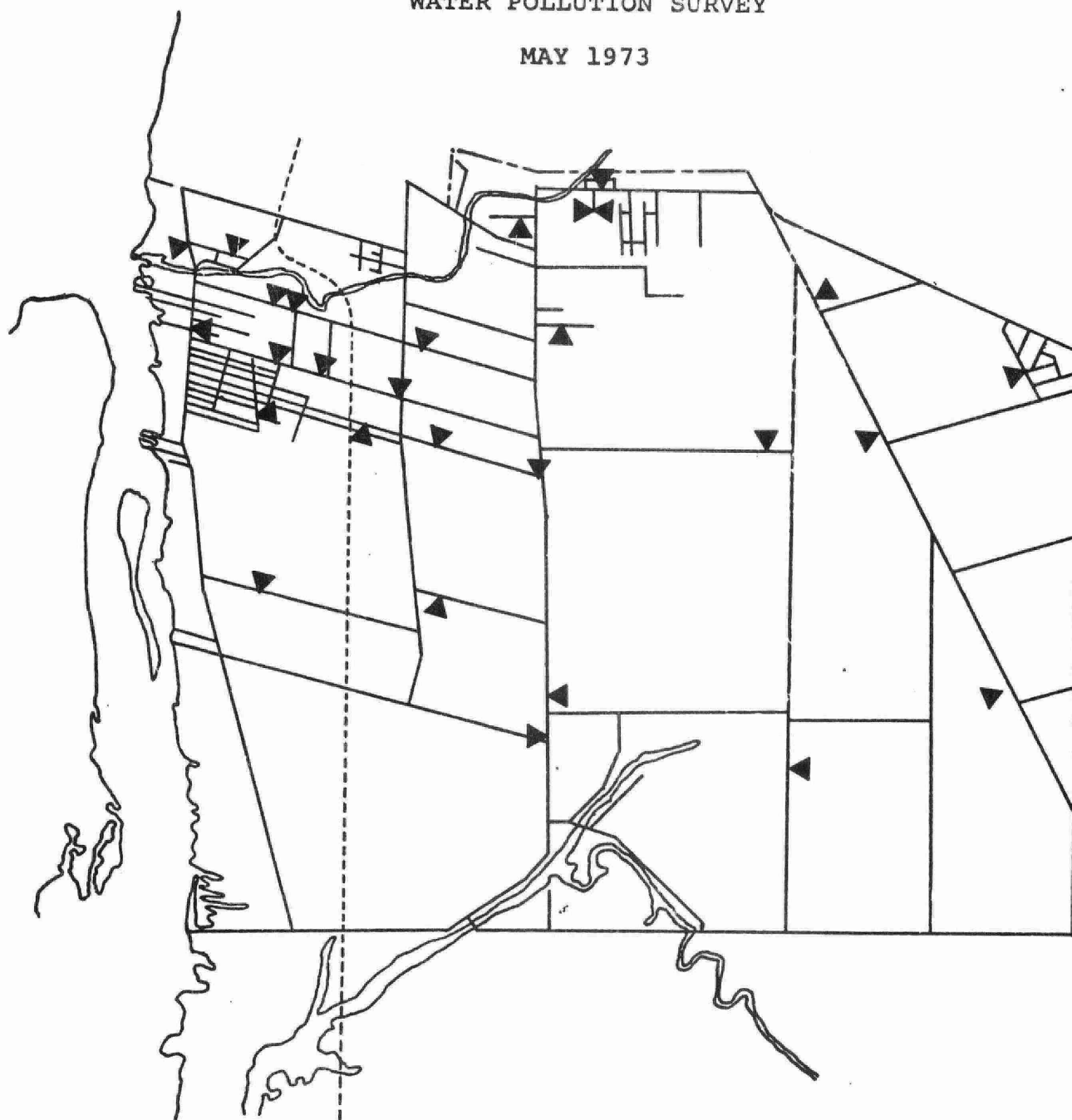
HOUSE CONSTRUCTION

FIGURE # 3

HOUSE CONSTRUCTION

Subsequent to the 1969 water pollution survey, an extensive sanitary sewer project was initiated. Even though it was clearly shown that the severity of water pollution was directly related to the magnitude of development, building was continued throughout the Township. Since 1969, the average annual rate of development has been 10.25 per cent based on population.

The location of houses under construction was noted and in most instances photographed during the survey (see Appendices II and III).

During the survey a total of 42 homes (see Figure 3) and 1 - 12 unit apartment building were noted to be in various stages of construction or recently built and not yet occupied. Of these, 23 were within the proposed sewer area and 19 were outside. All of these will presumably be serviced by septic tanks equipped with "relief overflows".

In consideration of the fact that the proposed sanitary sewer system is not anticipated to be operational until approximately 1976, the construction of homes even within the proposed sanitary sewer area presents a very real potential for further water pollution and public health hazards through malfunctioning tile bed systems.

The homes on the east half of Golfview Drive have been in existence for approximately five years and are serviced by septic tank systems. It is understood that at the time of construction, exceptional care, such as raised tile beds, was taken to ensure their optimum performance. A field tile draining the back lots of a group of homes on the north side

of Golfview Drive was sampled (location point No. 98: BOD₅ - 110 mg/l, Suspended solids - 60 mg/l, Total Kjeldahl - 13 mg/l, Total Phosphorus - 3.5 mg/l, Fecal Coliforms 16,000/100 ml, Total Coliforms - 100,000,000/100 ml). The analyses results of this sample confirmed the fact that domestic wastes are gaining access to the Chappus Drain through this tile.

Based on the above example as well as the failure of septic tank systems in virtually every area of the Township, the failure of the systems currently being installed appears inevitable. It is therefore very likely that these systems within the sewer area will fail prior to the completion of the proposed sanitary sewer system.

The inherent problems of strip development in general are well known and have repeatedly been emphasized to the Township. The extensiveness and related costs of the proposed sanitary sewer system exemplifies only one of many associated problems.

Strip development is continuing in the Township. By the process of infilling along the Township roads, the many related problems of strip development are compounding. At one location in the Township near the corner of Malden Road and Martin Lane a linear strip of 8 homes were noted in various stages of construction (location point number 102).

PHYSICAL CHARACTERISTICS

Topography

The entire Township is essentially flat and has a rise of only five feet from west to east across the entire Township. The Detroit River currently at an extremely high level, can be considered at essentially the same elevation as the surface of the western regions of the Township. Open drainage ditches in this area are full and contain essentially Detroit River water as opposed to surface runoff. The water table even at normal river stages, is within a few feet of the surface at any one point throughout the entire Township and can be considered even higher at this time in view of the excessive precipitation, high water levels and flooding which have occurred recently in south-western Ontario.

Soils and Drainage

Soils in the Township consists of two main types, fine silty sand and silty clay.

A fine silty sand with varying amounts of silt and clay is located in the north-west. Some of these fine sandy soils exhibit a poor but acceptable permeability for tile bed use, however the high water table and poor surface drainage make most of the areas underlain by these soils unacceptable for septic tank system.

The areas to the south and east in the township consist primarily of silty clay which exhibits an unacceptable permeability for septic tank tile bed systems.

A detailed soil map (see Figure 4), taken from a Soil Survey by the University of Guelph, Department of Soils, locates and identifies the various classifications of soil within the Township. The majority of these soils are noted to have poor drainage characteristics.

TOWNSHIP OF SANDWICH WEST

WATER POLLUTION SURVEY

MAY 1973

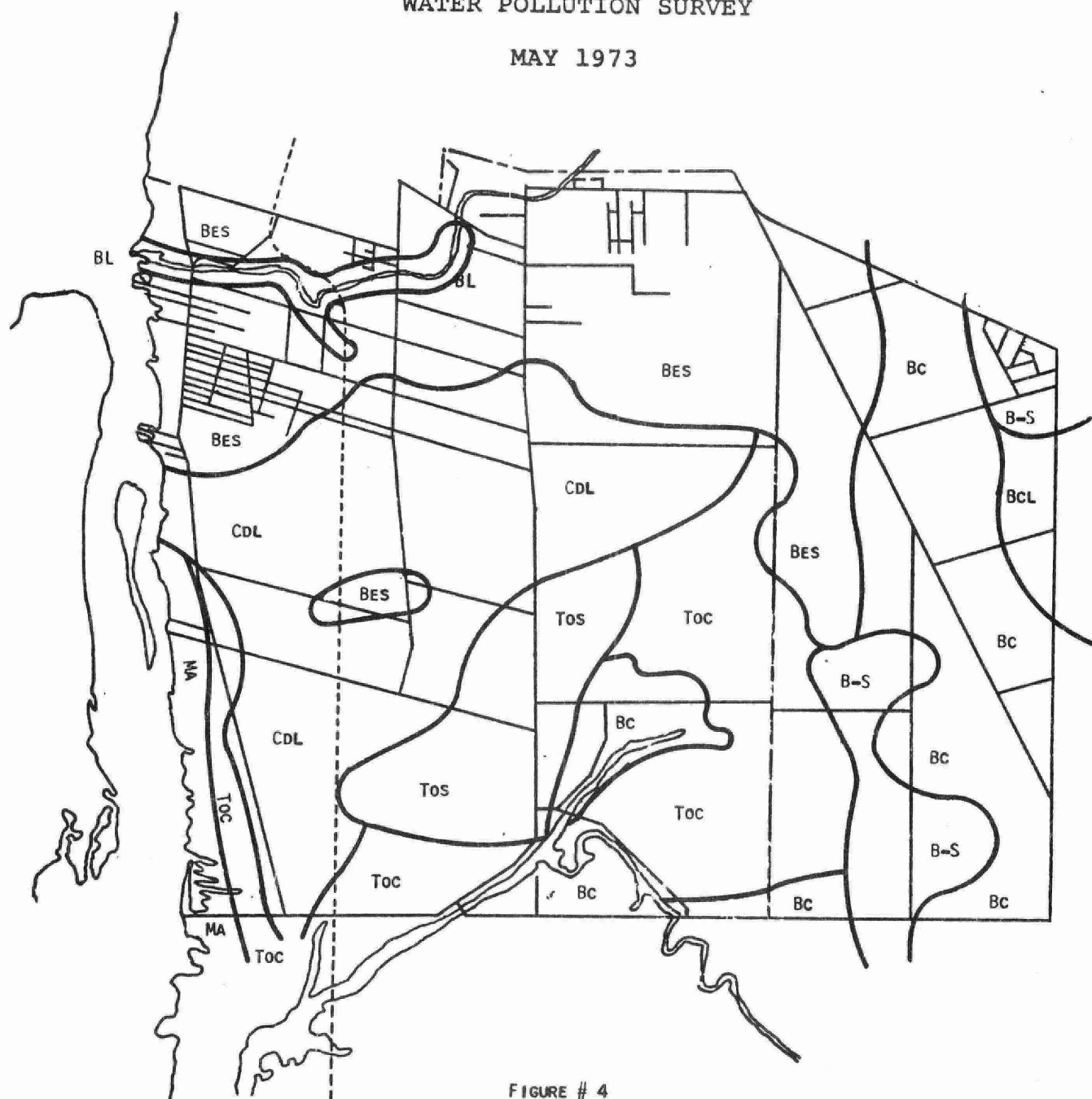


FIGURE # 4
SOIL MAP

BC - BROOKSTON CLAY - POOR NATURAL DRAINAGE

Toc - TOLEDO CLAY - POOR NATURAL DRAINAGE

BCL - BROOKSTON CLAY LOAM - POOR NATURAL DRAINAGE

Tos - TOLEDO SILT LOAM - POOR NATURAL DRAINAGE

CDL - COLWOOD FINE SANDY LOAM - POOR DRAINAGE

B-S - BROOKSTON CLAY SAND SPOT PHASE - POOR NAT. DRAINAGE

BL - BOTTOM LAND - DRAINAGE VARIABLE

MA - MARSH - VERY POOR NATURAL DRAINAGE

BES - BERRIEN SAND - FAIR TO POOR DRAINAGE

WATER SUPPLY

Water is purchased from the Windsor Utilities Commission and distributed through a network of 6-inch and 8-inch diameter water mains. Generally, the location of the water mains coincides with the strips of development along the Township roads. Due to the excessive lengths of relatively small diameter water mains, severe pressure problems have developed. Recent extensions to existing mains have been approved only to eliminate public health hazards.

In an attempt to alleviate the pressure problems, the Township has reached an agreement with the City of Windsor to provide large diameter extensions from the Windsor system.

Once the improvements to the system have been completed, there will be a tendency to attract more users along existing mains at increased rates of consumption. Extensions to existing mains within the Township will also be technically feasible. In view of the inherent sewage disposal problems associated with increased water use, strict control should be adhered to once the modifications have been implemented. Extensions to, or increased use of, existing water mains should only be permitted where sanitary sewers exist and when they become operational.

SEWAGE DISPOSAL

At the present time all development in the Township is served by individual septic tanks. This survey will show that these have failed in virtually every area of the Township.

The septic tank systems are usually equipped with a "relief overflow" intended to lower the water table in and around the tile bed system during heavy rainfall. The by-pass system consists of a pipe connecting the tile

bed system to the ditch or storm sewer. It is installed at a level slightly higher than the bed in an attempt to avoid direct discharge of septic tank effluent to the ditch. However, the same circumstances, (ie., high water table and/or poor soil conditions) causing problems during rainfall also caused tile bed failures. The "relief overflows" then become a method of direct discharge of septic tank effluent to the drainage ditches. Since the homeowner does not have the problem of sewage ponding on his property, there is little incentive to attempt any repair to a system which has failed.

In the interest of alleviating these water pollution and public health problems, a system of sewers has been proposed for specific areas in the Township. These areas to be serviced have been chosen, based on the severity of pollution and economic feasibility. The proposed sewers, therefore, have been confined to dense strips of development and concentrations such as the Oliver Project and the LaSalle area.

TOWNSHIP OF SANDWICH WEST

WATER POLLUTION SURVEY

MAY 1973

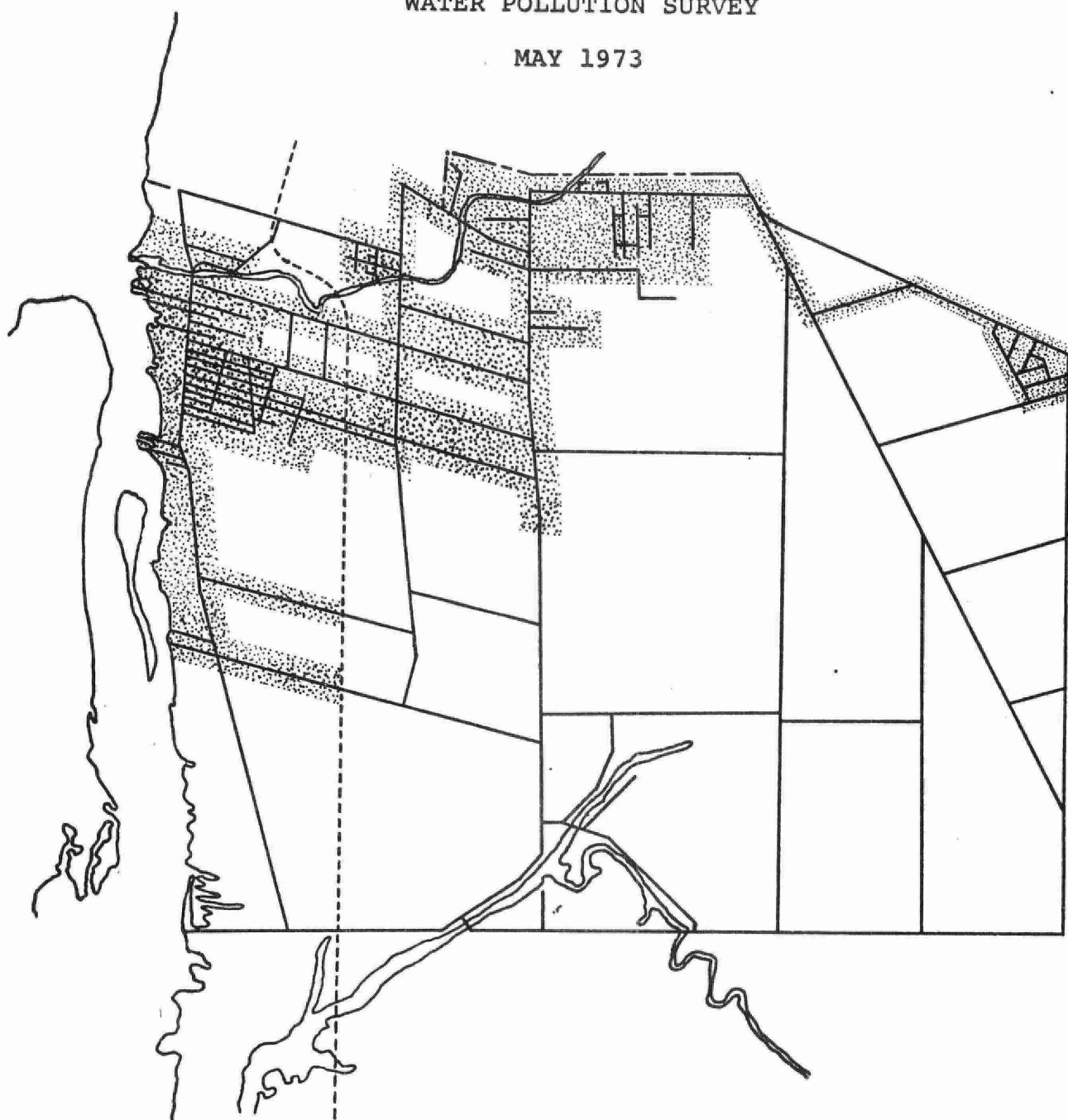
PROPOSED SEWER AREA

FIGURE # 5

WATER POLLUTION SURVEY

The water pollution survey was performed on May 1 to May 4 inclusive during mixed weather conditions. The weather varied from intermittent rain on May 1st to cloudy and dry on May 4th.

The majority of the field survey consisted of sampling the contents of roadside ditches and drains within the Township. Visual observations as well as odours were noted where significant. Where possible, an estimate of the flow was made and recorded. Photographs were taken of exceptional locations or locations where observations were typical of a situation and are recorded in Appendix III.

The field observations for all stations, as well as chemical and bacteriological analyses results for these stations sampled, have been summarized and are provided in Appendix II of this report. For purposes of reporting the survey, the Township was divided into two major sections, one where sanitary sewers are proposed, and the other where there are no current plans to service. Each of these sections was then sub-divided into smaller areas for description purposes.

A record of houses noted to be under construction during the survey was also kept and photographs taken of the majority of these instances.

PREVIOUS SURVEY

In May and June of 1969, staff of the Ontario Water Resources Commission conducted a water pollution survey in the Township of Sandwich West. The survey confirmed that pollution existed in virtually all areas of the Township where development had taken place, particularly in the LaSalle area. As a result of this survey an extensive sanitary sewer program was initiated to alleviate the water pollution noted at that time.

SURVEY

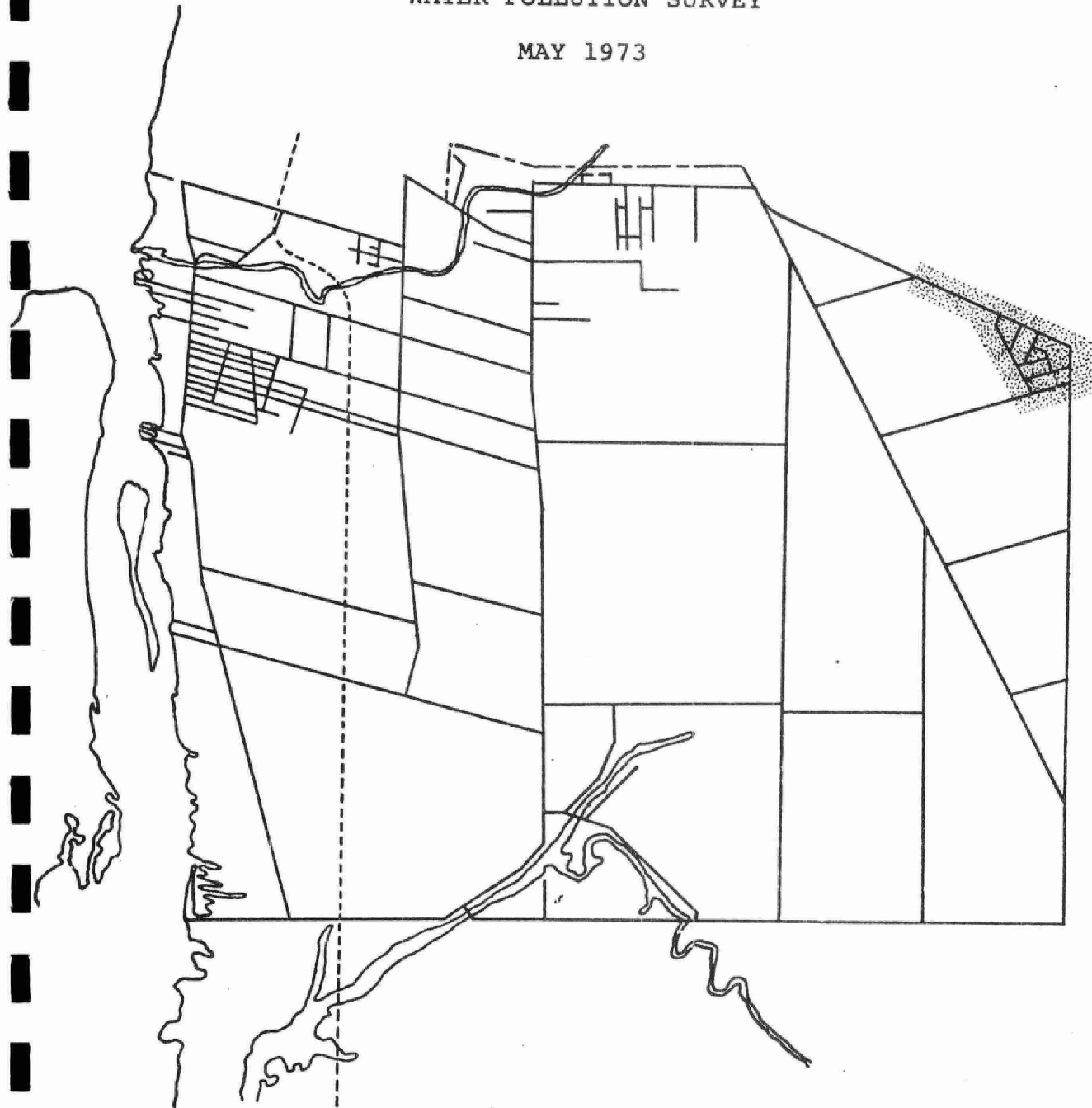
WITHIN

PROPOSED SEWER AREA

TOWNSHIP OF SANDWICH WEST

WATER POLLUTION SURVEY

MAY 1973

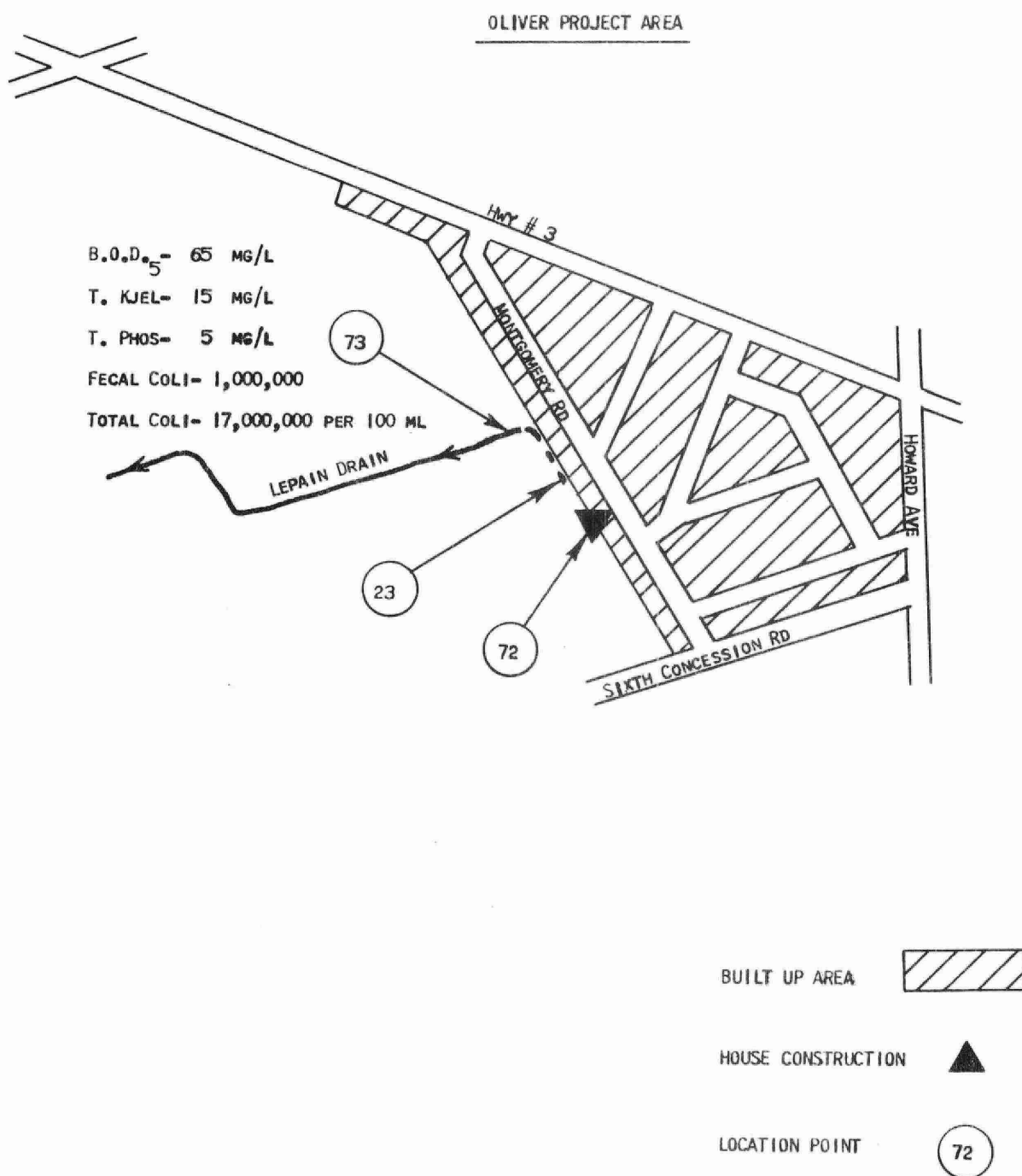
OLIVER PROJECT AREA

SURVEY WITHIN PROPOSED SEWER AREAOLIVER PROJECT AREA

The Oliver project consists of approximately 120 homes at the junction of Highway #3 and Howard Avenue.

The area is drained by Lepain Drain which is covered within the built-up area but surfaces west of the development immediately behind homes on Montgomery Avenue. Flow at the time of the inspection was estimated to be 15 to 20 gpm. The drainage was noted to be grey-black in colour with a distinct sewage odour. Sewage fungus was noted on debris and weeds in the drain. These visual observations may be seen in photographs #11 and #12. Samples taken of the drain confirmed its grossly polluted nature (location point number 73: BOD_5 - 65 mg/l, fecal coliform - 1,000,000/100 ml, total coliform - 17,000,000/100 ml).

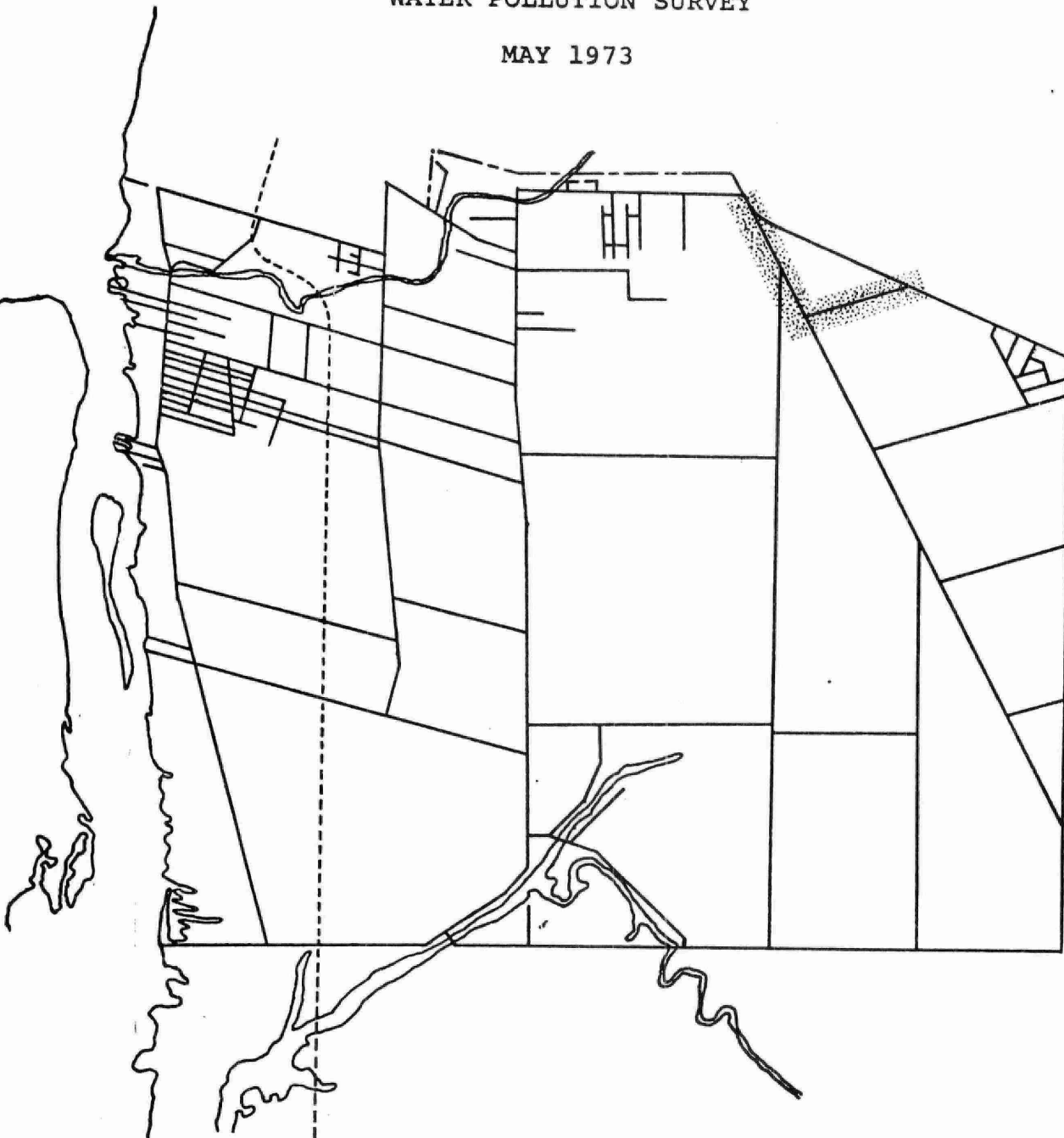
House construction was noted to be underway on Montgomery Avenue (location point number 72, photograph #10) with the ground floor being laid at the time. This house would presumably be on a septic tank as are the other homes in the development.



TOWNSHIP OF SANDWICH WEST

WATER POLLUTION SURVEY

MAY 1973



COUSINEAU RD - HURON CHURCH LINE RD AREA

COUSINEAU ROAD AREA

This area consists of Cousineau Road between Highway #3 and Huron Church Line Road and includes the first stubs of Daytona, Northway and Betts streets extending from Cousineau Road. There are approximately 25 homes in this area.

The area is drained by roadside ditches in which there was no visible flow, however, ponding in the ditches was occurring at several locations. Ponding on Cousineau Road (location point number 76, photograph #15) was sampled and possessed a BOD₅ of 130 mg/l, a fecal coliform count of 610,000/100 ml, and a total coliform count of 2,300,000/100 ml.

A distinct sewage odour was present in the ponding in question and possessed a grey-black colour.

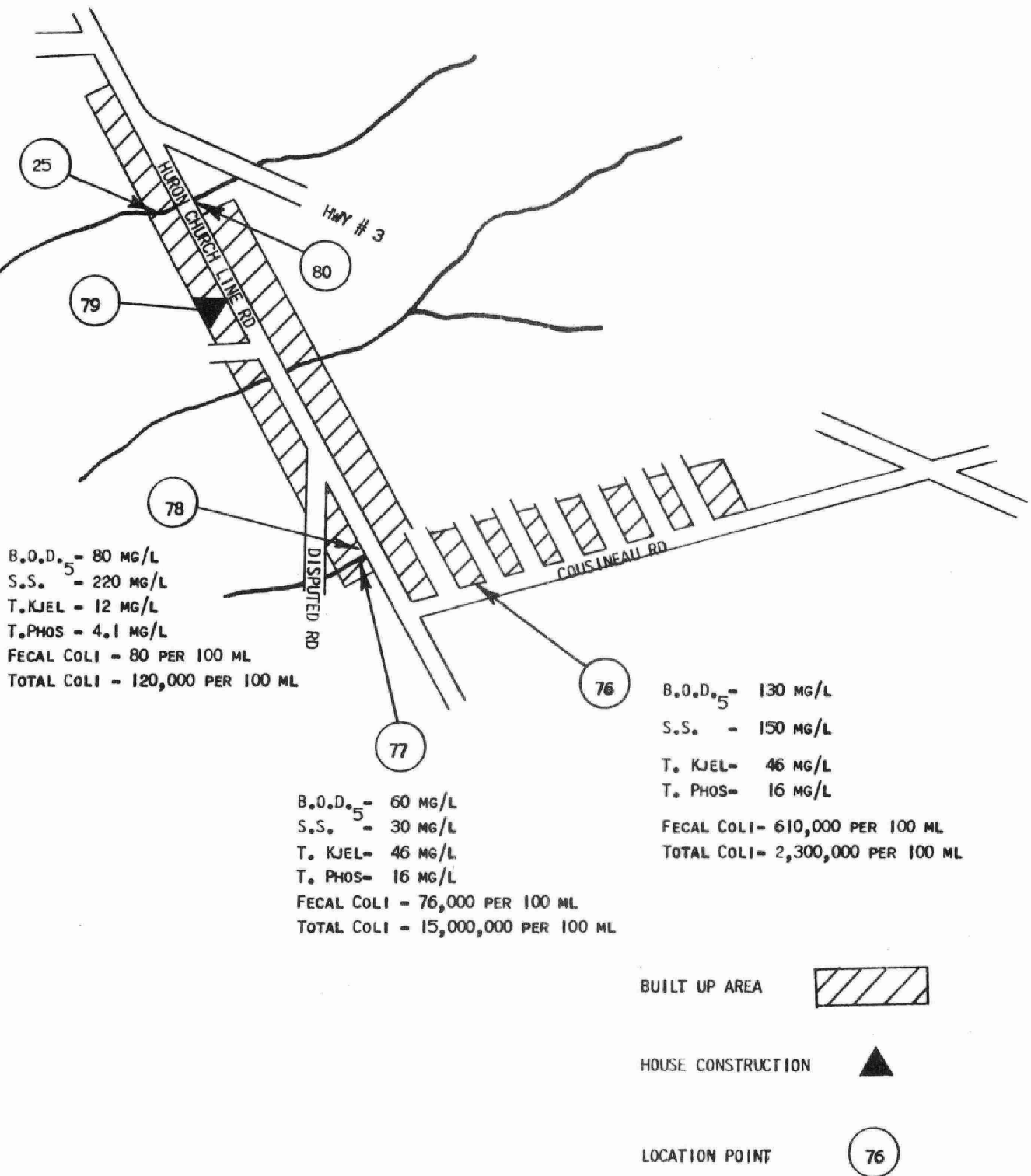
HURON CHURCH LINE ROAD AREA

This area consists of approximately 30 homes on Huron Church Line Road between Cousineau Road and Todd Street.

Two samples (location points numbers 77 and 78) were taken of the drainage ditches serving a relatively recent development between Disputed Road and Broderick Road. One sample (location point number 77: BOD₅ - 60 mg/l, fecal coliforms - 76,000/100 ml, total coliforms - 15,000,000/100 ml) was of the drain crossing under Huron Church Line Road flowing from the east ditch at a rate of 1 to 2 gpm and the other sample (location point number 78: BOD₅ - 80 mg/l, fecal coliforms - 80/100 ml, total coliform - 120,000/100 ml) was of the west ditch flowing south at a rate of approximately 1/2 gpm.

House construction was noted to be underway on Huron Church Line Road
(location point number 79) presumably utilizing a septic tank for sewage disposal.

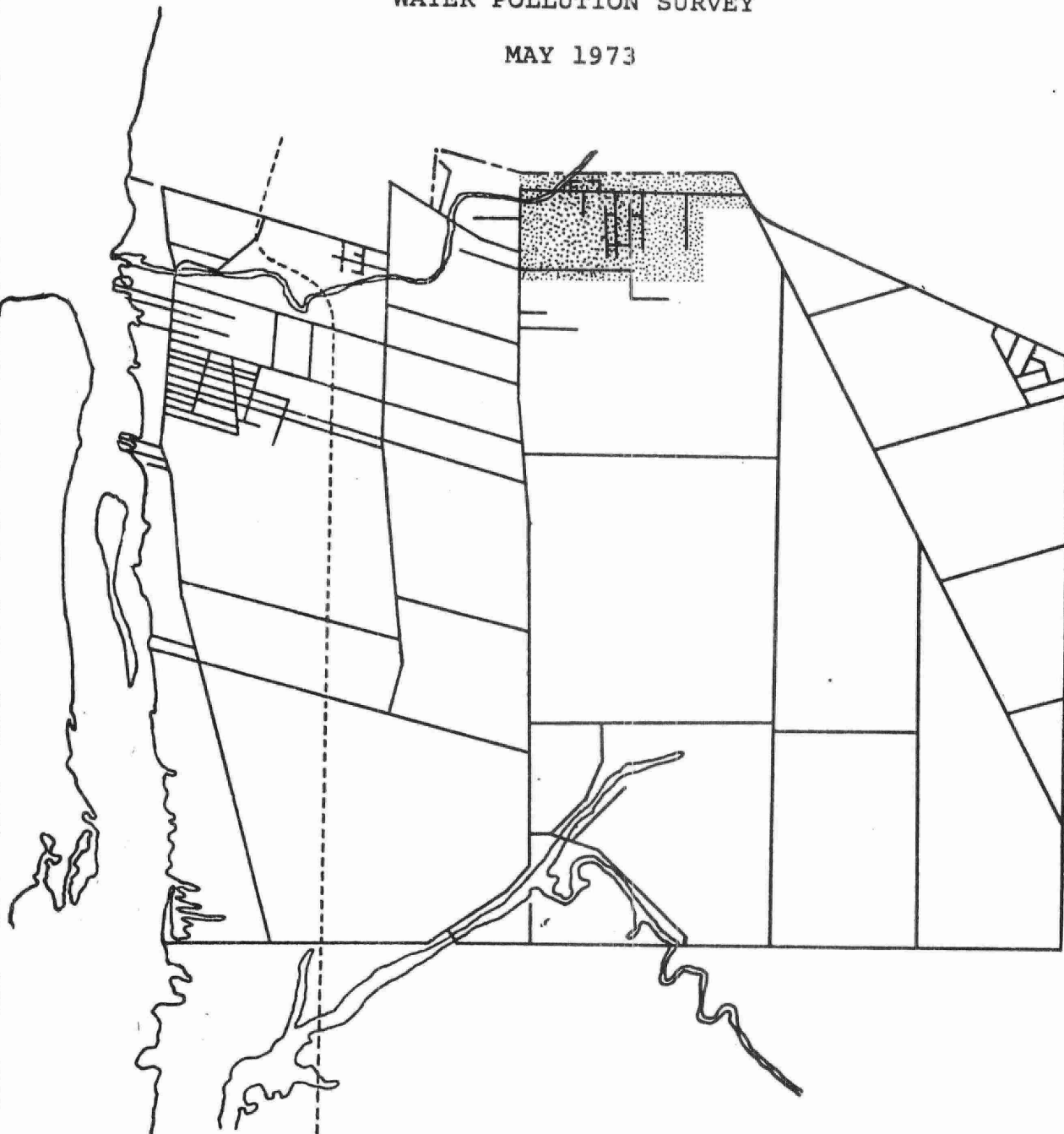
COUSINEAU RD - HURON CHURCH LINE RD AREA



TOWNSHIP OF SANDWICH WEST

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TODD ST AREA

TODD STREET AREA

This area includes Todd Street and the related abutting streets and consists of approximately 250 homes.

The drains on Todd Street are sub-surface and discharge to the Grand Marais Drain (Turkey Creek) at Todd Street. Due to high water levels in the Detroit River and subsequently Turkey Creek, the outfall was submerged to the extent that a representative sample could not be taken.

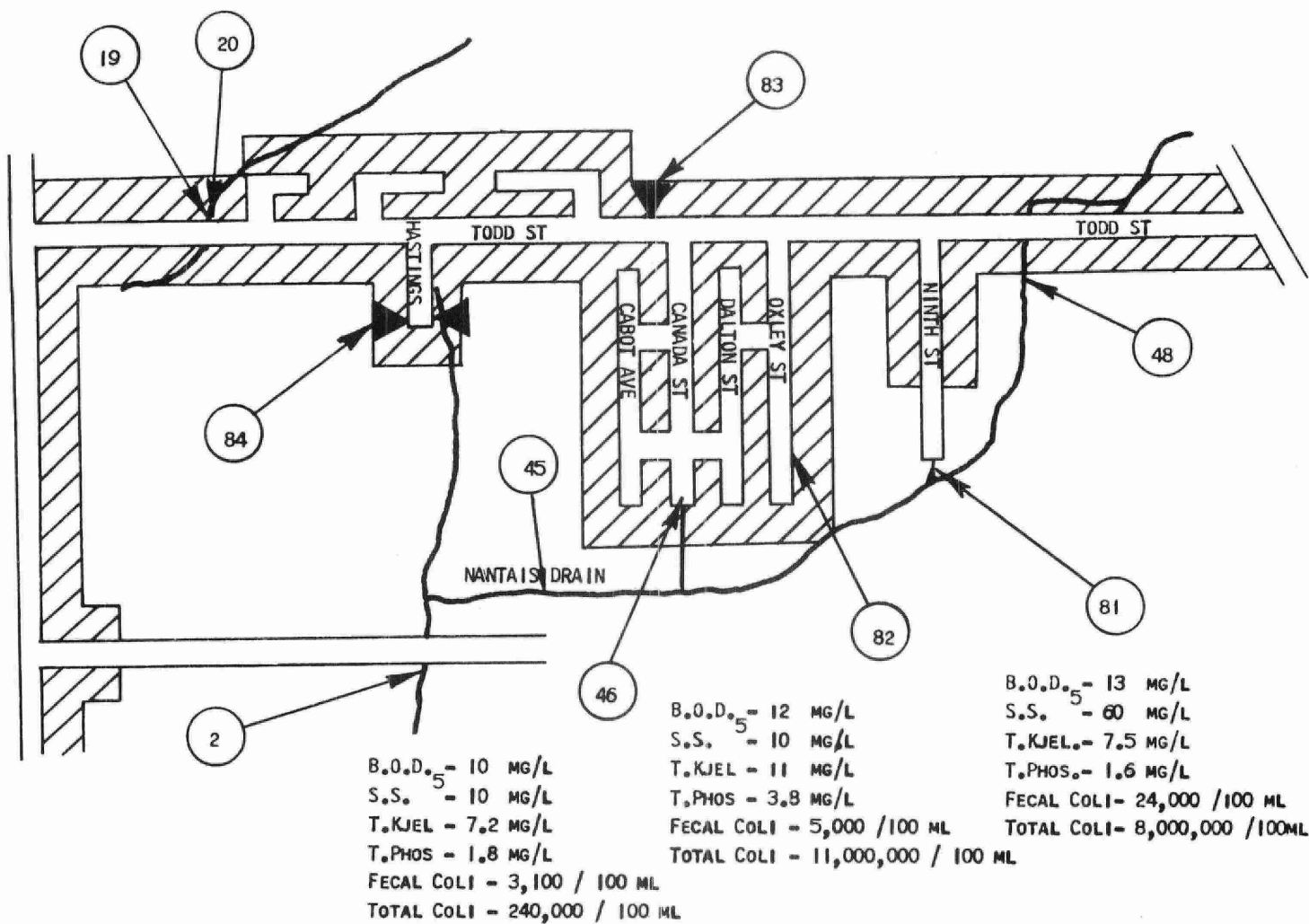
The Ninth Street storm sewer was sampled at Nantais Drain (location point number 81: BOD₅ - 13 mg/l, fecal coliform - 24,000/100 ml, total coliform - 8,000,000/100 ml). Prior to entry to Nantais Drain, the sub-surface drain surfaces. The sample, which was grey-black in colour and possessed a distinct sewage odour was taken from the mouth of the partially submerged outfall.

The storm drain on Oxley Street was sampled at a catch basin (location point number 82: BOD₅ - 13 mg/l, fecal coliform - 5,000/100 ml, total coliform - 11,000,000/100 ml) possessing considerable flow estimated to be 6 to 8 gpm. A strong sewage odour was present and worthy of note is the fact that the writer actually heard the sound of a flushing toilet from the storm sewer.

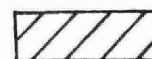
At the foot of Canada Street, a catch basin was sampled (location point number 46: BOD₅ - 10 mg/l, fecal coliform - 3,100/100 ml, total coliform - 240,000/100 ml). There was flow in the manhole, and a slight sewage odour was present.

It was noted that two houses had been built on Hastings Drive since the aerial photographs were taken during the summer of 1972. These houses were in the final stages of construction and it is presumed that septic tanks equipped with overflows will be utilized for sewage disposal. Another house on Todd Street was also under construction with the framing being recently completed.

TODD ST AREA



BUILT UP AREA



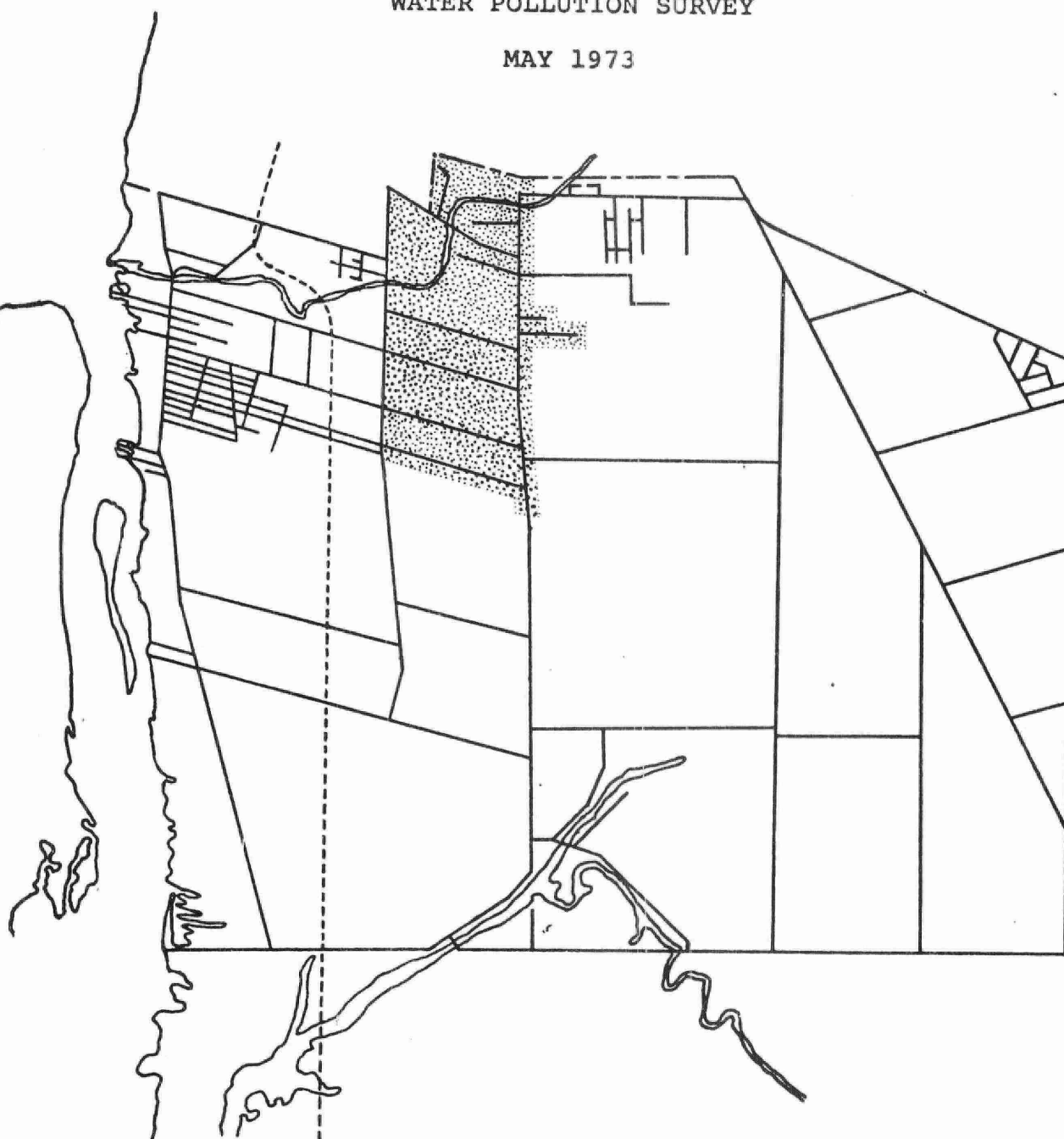
HOUSE CONSTRUCTION



LOCATION POINT

82

TOWNSHIP OF SANDWICH WEST
WATER POLLUTION SURVEY
MAY 1973

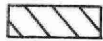


MALDEN RD - MATCHETTE RD AREA

BUILT UP AREA

HOUSE CONSTRUCTION

LOCATION POINT



85

85

21

86

87

88

89

92

91

90

93

94

96

97

STUART BLVD

ORFORD ST

NORMANDY ST

SUZANNE ST

FECAL COLI-
7,000FECAL COLI-
80,000 / 100 MLFECAL COLI-
80,000 / 100 MLB.O.D.₅ - 95 MG/L
FECAL COLI-
2,200 / 100 MLB.O.D.₅ - 3,400 MG/L

REAUME AVE

BOUFFARD RD

BOUFFARD RD

LAURIER DR

MALDEN RD

MALDEN RD

MATCHETTE RD

SPRUCEWOOD RD

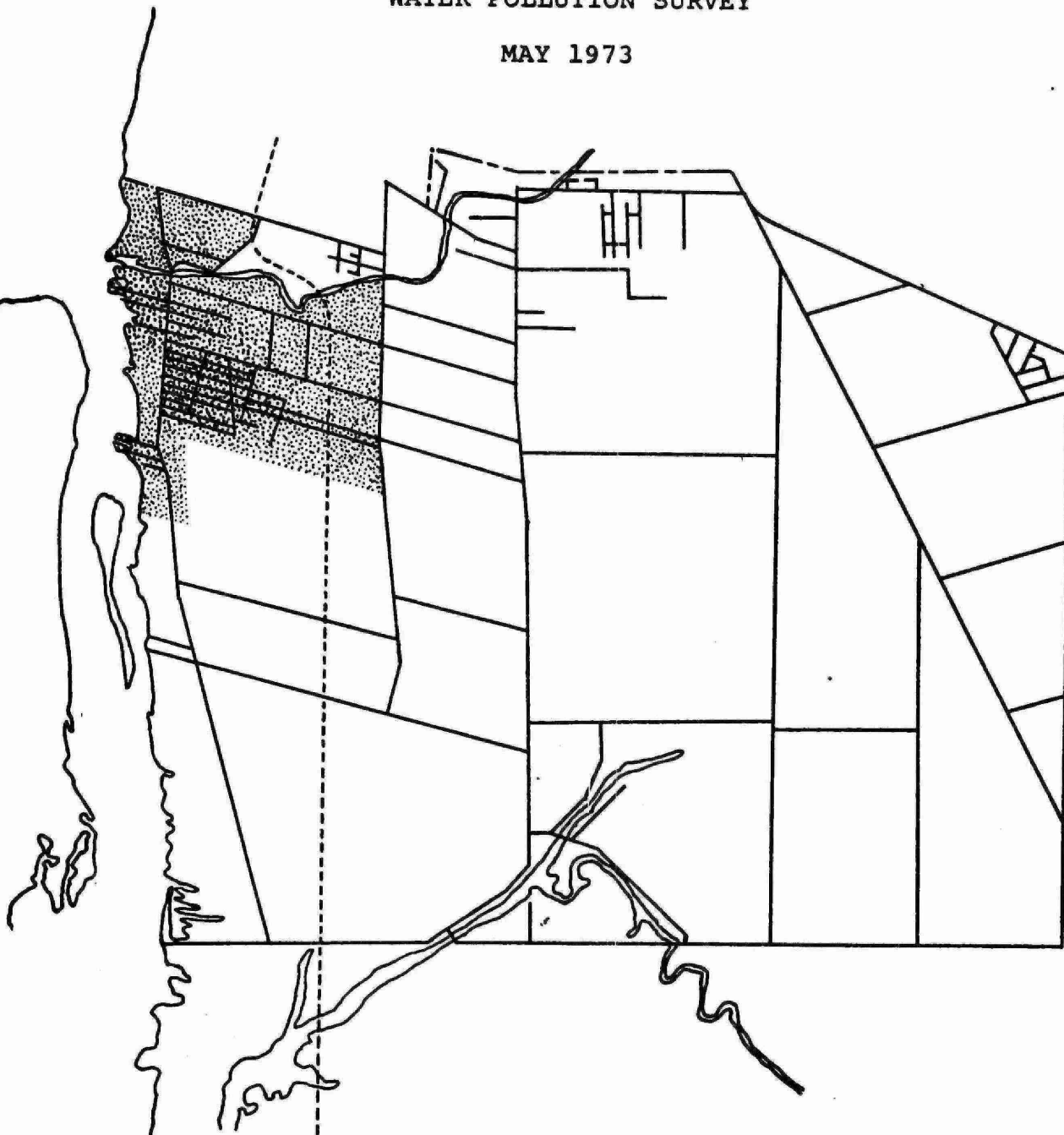
MALDEN ROAD - MATCHETTE ROAD AREA

This area consists of the development between Malden Road and Matchette Road from the northerly extent of the Township to Laurier Drive in the south, approximately 450 homes are situated in this area. Suzanne Street and Omira Street will also be included in this area. Most of the development exemplifies characteristic strip or ribbon development.

Drainage in the area is generally by open roadside ditches, and while flow in these ditches was minimal or non-existent at the time of the inspection, significant pollution was detected in the ponding (see location points number 87, 88, 90, 93, and 94).

Several homes were under construction in this area: one recently completed on Orford Street (location point number 85); one on Reaume Avenue with framing nearly complete (location point number 89); one on Suzanne Street being framed (location point number 86); two on Laurier Drive, one having the foundation being laid, and the other being framed (location point 96); and one on Malden Road being finished (location point number 97). All of these homes will presumably be serviced by septic tanks equipped with overflows.

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WATER POLLUTION SURVEY
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LASALLE AREA

LaSALLE AREA

The area will consist of development west of Matchette Road and north of Marentette Drain in the Township. Within this area is the concentration of development known as LaSalle which is the only area of the Township of a characteristic urban nature, combining commercial, residential, recreational and educational uses within a roughly defined area. LaSalle, however, occupies only a fraction of the area, the remainder being developed in the strip manner, as shown in the extensions of Reaume Avenue, Bouffard Road, Laurier Drive and Maple Avenue, from the LaSalle district to Matchette Road and beyond.

Drainage in the immediate LaSalle district is generally sub-surface with catch basins. This arrangement changes to open roadside ditches along development in the surrounding area.

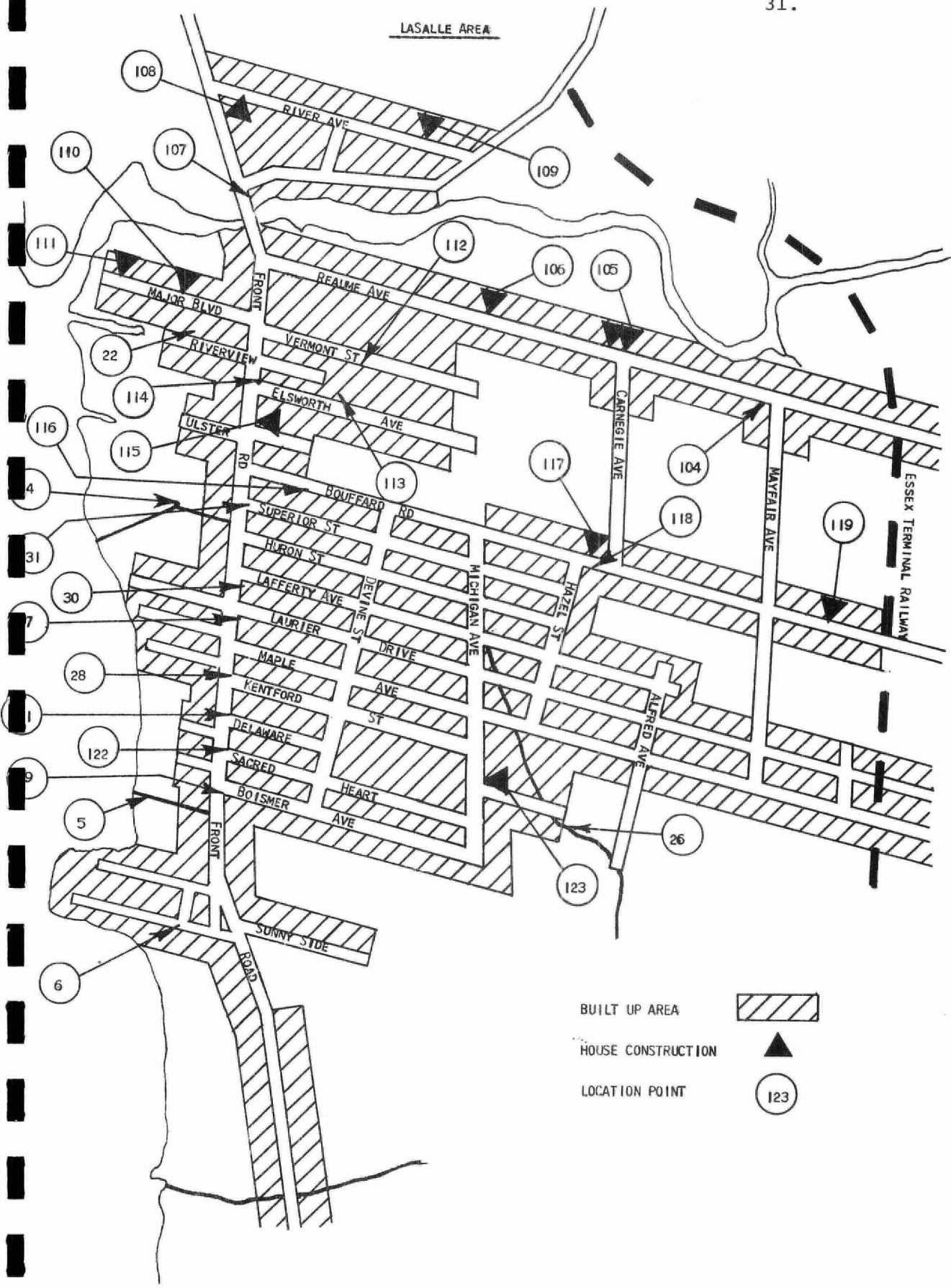
Evidence of gross pollution was found in the catch basins at the foot of virtually every street in the LaSalle district (location points number 27, 28, 29, 30, 31, 114, 121, and 122). The contents of these catch basins were invariably grey-black in colour and possessed a distinct sewage odour.

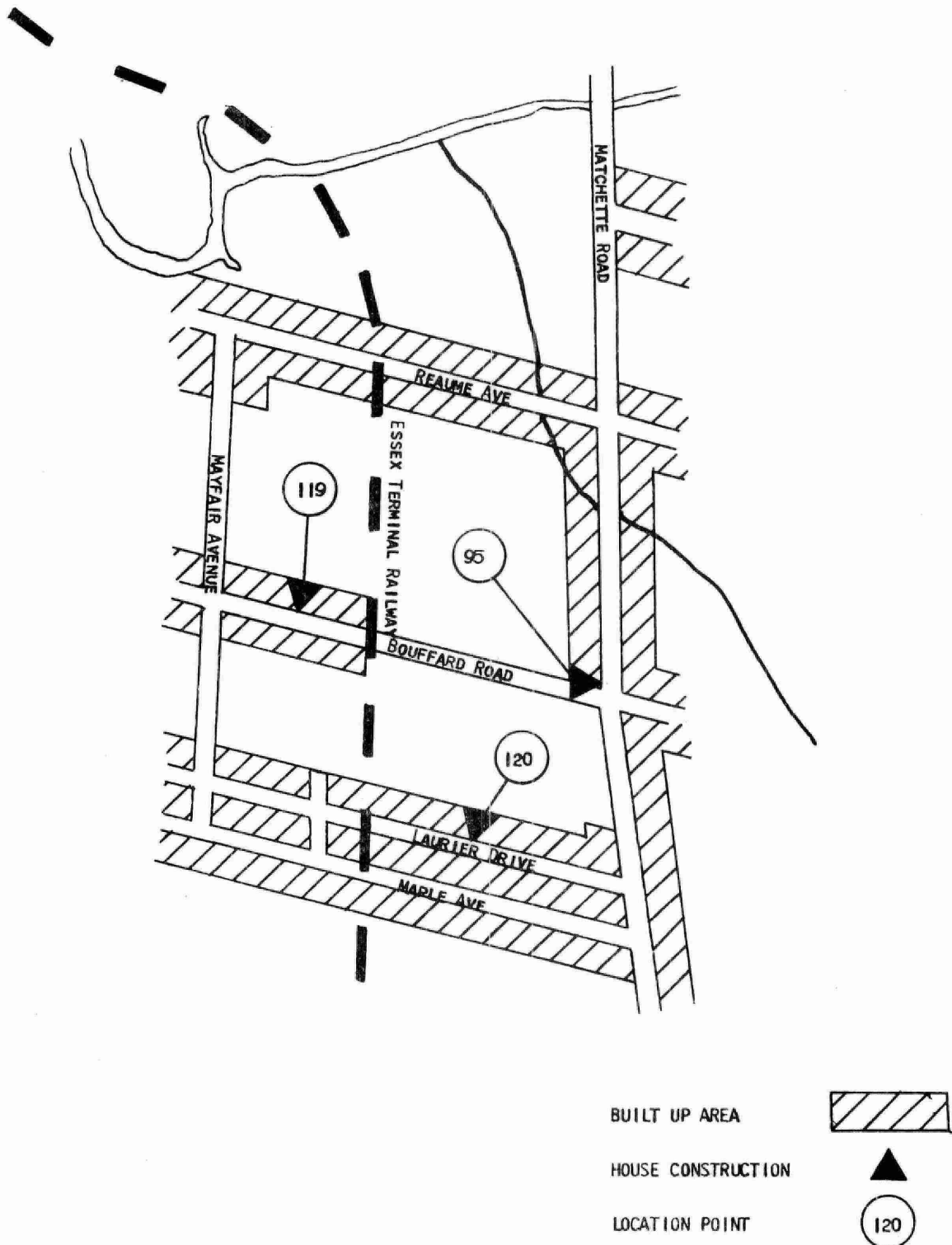
Pollution was also noted further inland in the roadside ditches (location points number 104, 113, 116 and 118). Of particular interest is sample point 116, on Bouffard Road approximately 1,000 feet east of Front Road.

Visual observations may be seen in photograph #28. Analyses results showed that the estimated 1 gpm flow possessed a BOD₅ of 460 mg/l, suspended solids of 860 mg/l, total kjeldahl nitrogen of 124 mg/l, total phosphorus of 18 mg/l, fecal coliforms of 120,000 per 100 ml and total coliforms of 16,000,000 per 100 ml.

The ditch draining the Front Road development just north of Turkey Creek (location point number 107: BOD₅ - G 78 mg/l, fecal coliforms - 42,000/100 ml, total coliforms - 24,000,000/100 ml) was also sampled, indicating substantial pollution. This was of particular concern in view of the relatively high flows estimated, namely, 5 to 7 gpm.

House construction was noted throughout the entire area. A total of 14 houses and one - 12 unit apartment building were in various stages of construction and will presumably be serviced by septic tank systems.

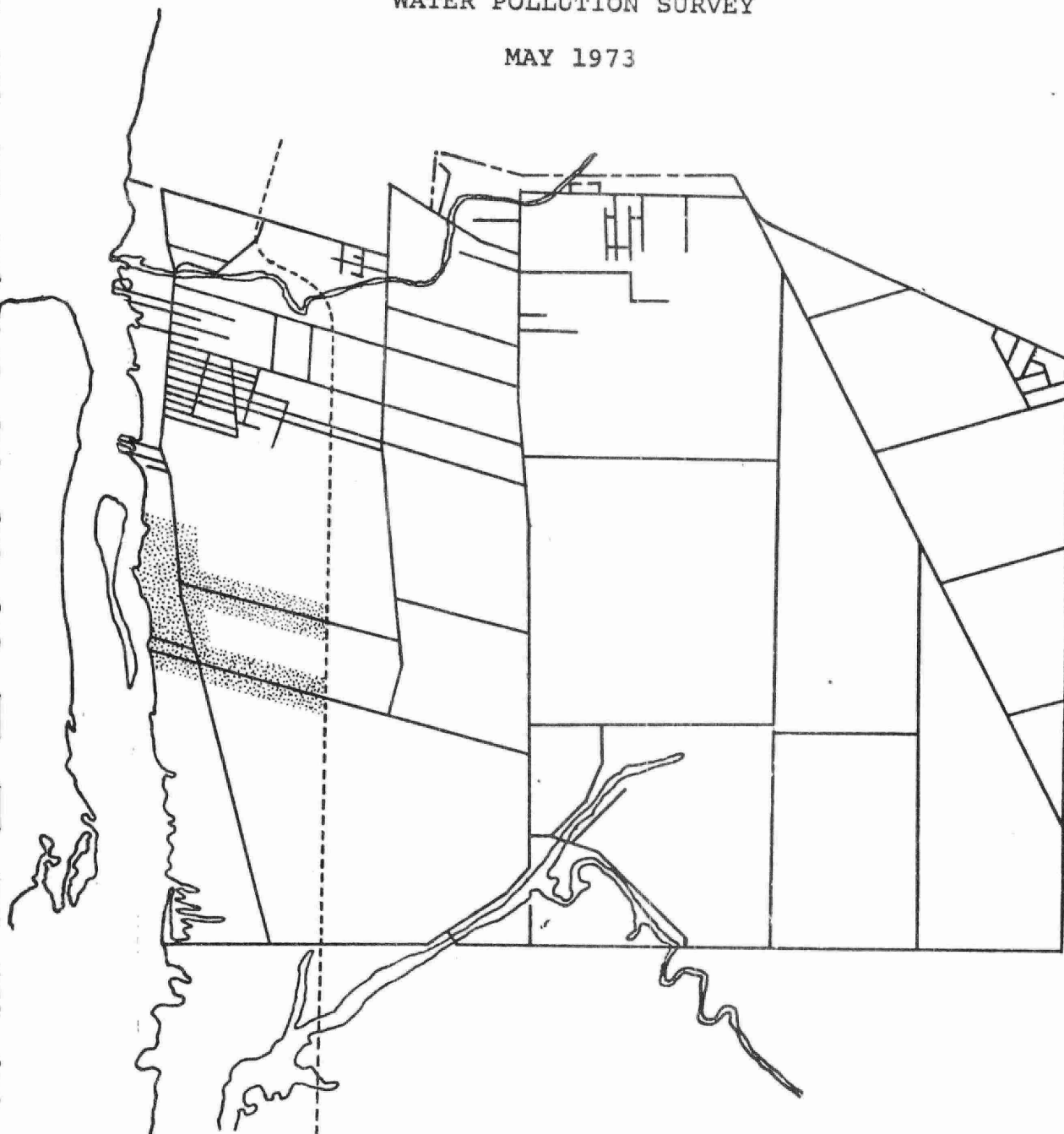


LASALLE AREA (CONTO)

TOWNSHIP OF SANDWICH WEST

WATER POLLUTION SURVEY

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VICTORY ST - MARTIN LANE AREA

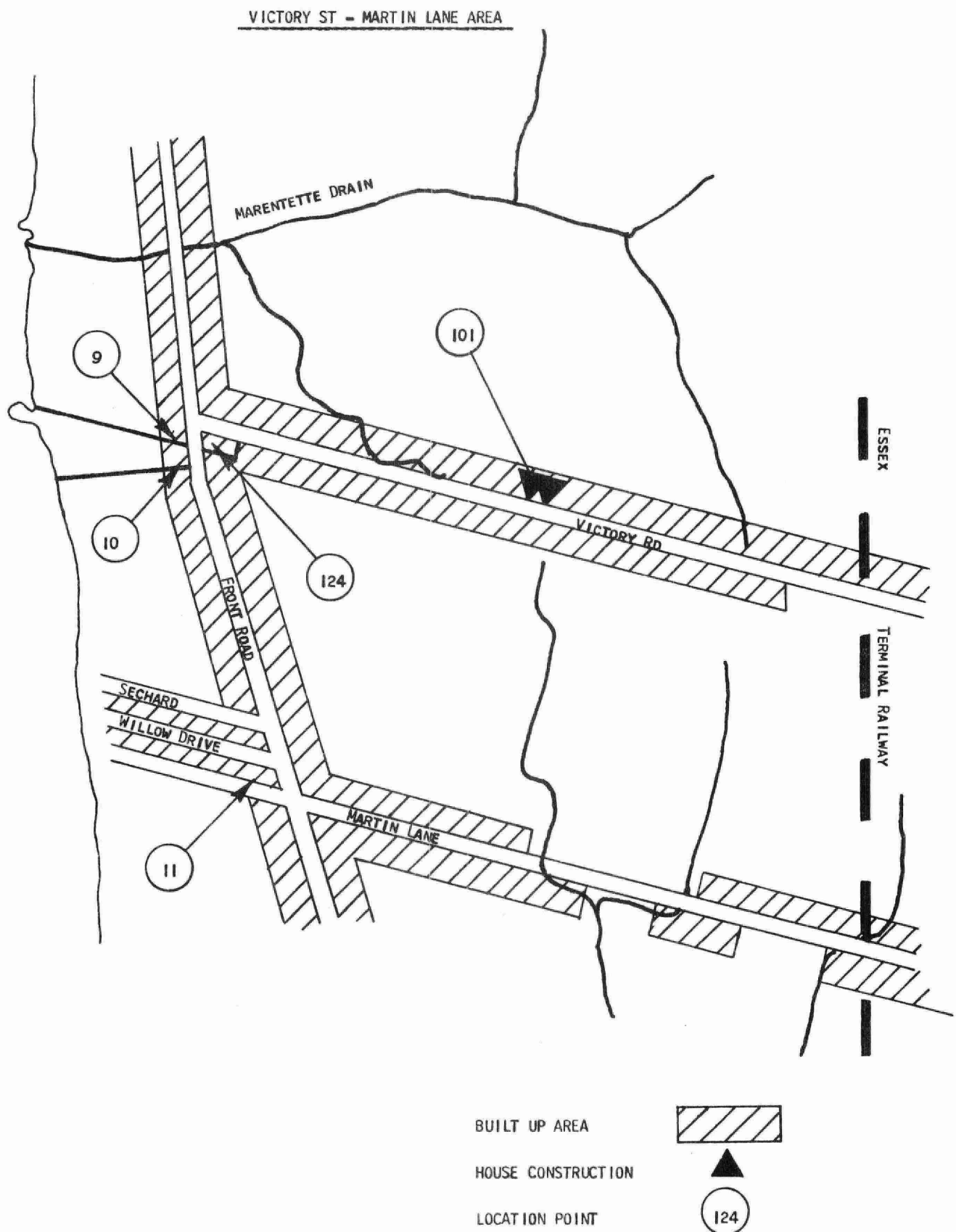
VICTORY STREET - MARTIN LANE AREA

This area consists of Victory Street and Martin Lane from the Essex Terminal Railway tracks to the Detroit River and including approximately 200 homes.

Drainage in the area is primarily open roadside ditches draining to the Detroit River.

The catch basin at the foot of Victory Street and the drain to the Detroit River were sampled indicating contamination from sanitary wastes. The drain at the foot of Martin Lane was not sampled because results would not be representative due to Detroit River water in the drain. The drainage ditches were dry further inland and no samples were taken.

House construction was noted on Victory Street and presumably will be serviced by septic tank systems.

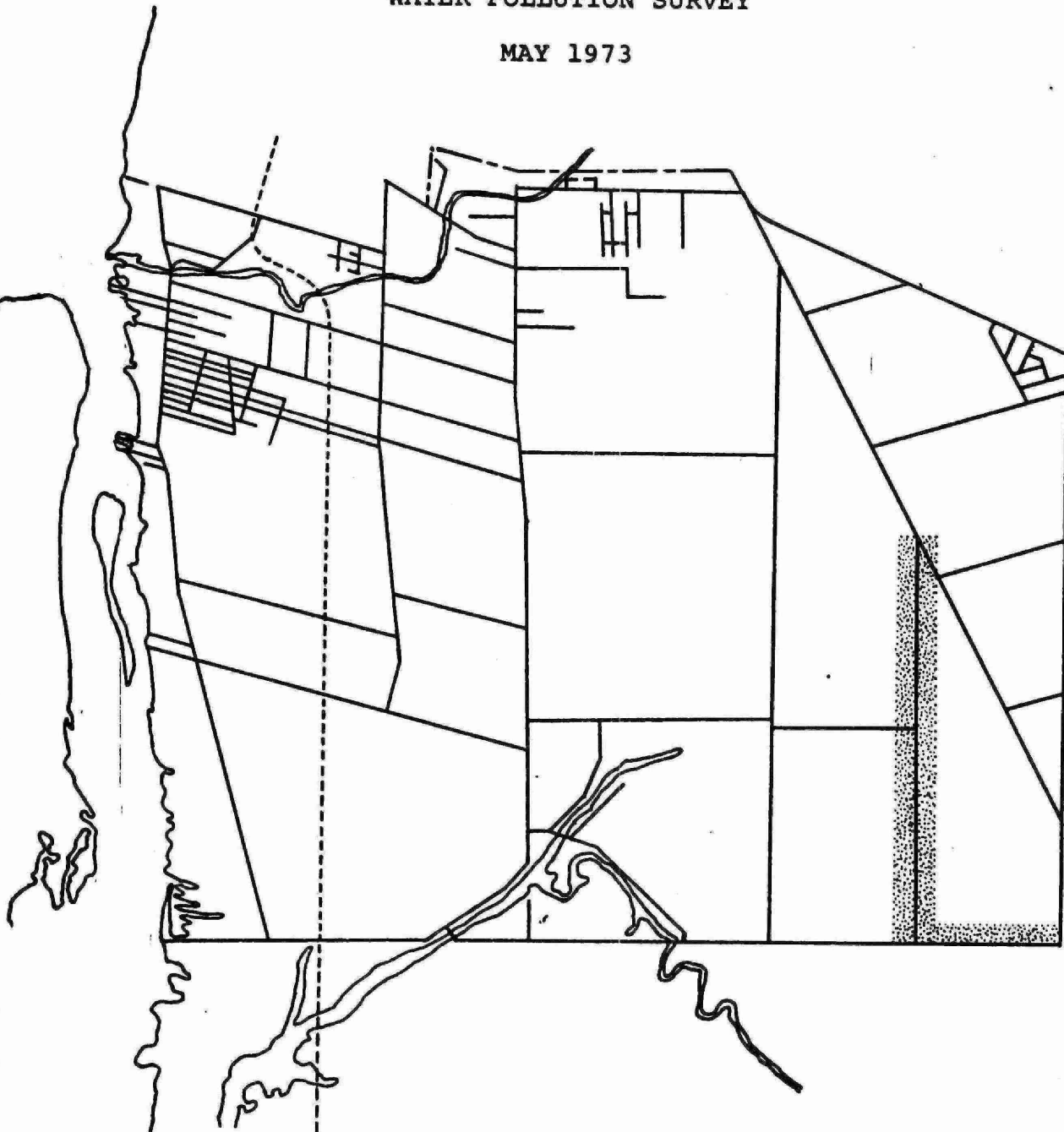


SURVEY
OUTSIDE OF
PROPOSED SEWER AREA

TOWNSHIP OF SANDWICH WEST

WATER POLLUTION SURVEY

MAY 1973



BRODERICK ROAD AREA

SURVEY OUTSIDE OF PROPOSED SEWER AREABRODERICK ROAD AREA

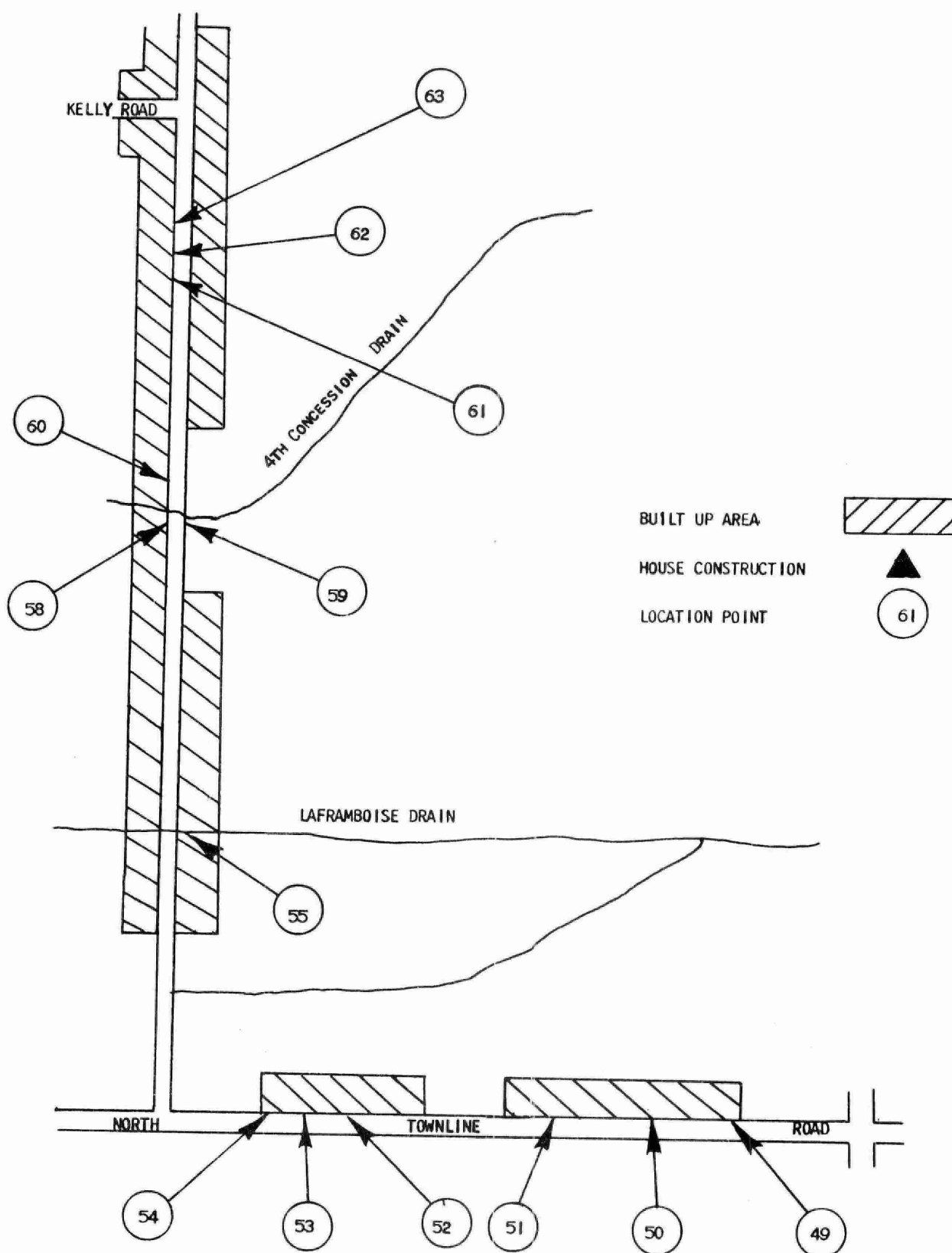
This area comprises approximately 1,200 feet of Broderick Road from Huron Church Line Road to North Town Line Road and includes North Town Line Road from Broderick Road to Howard Avenue and includes approximately 90 homes.

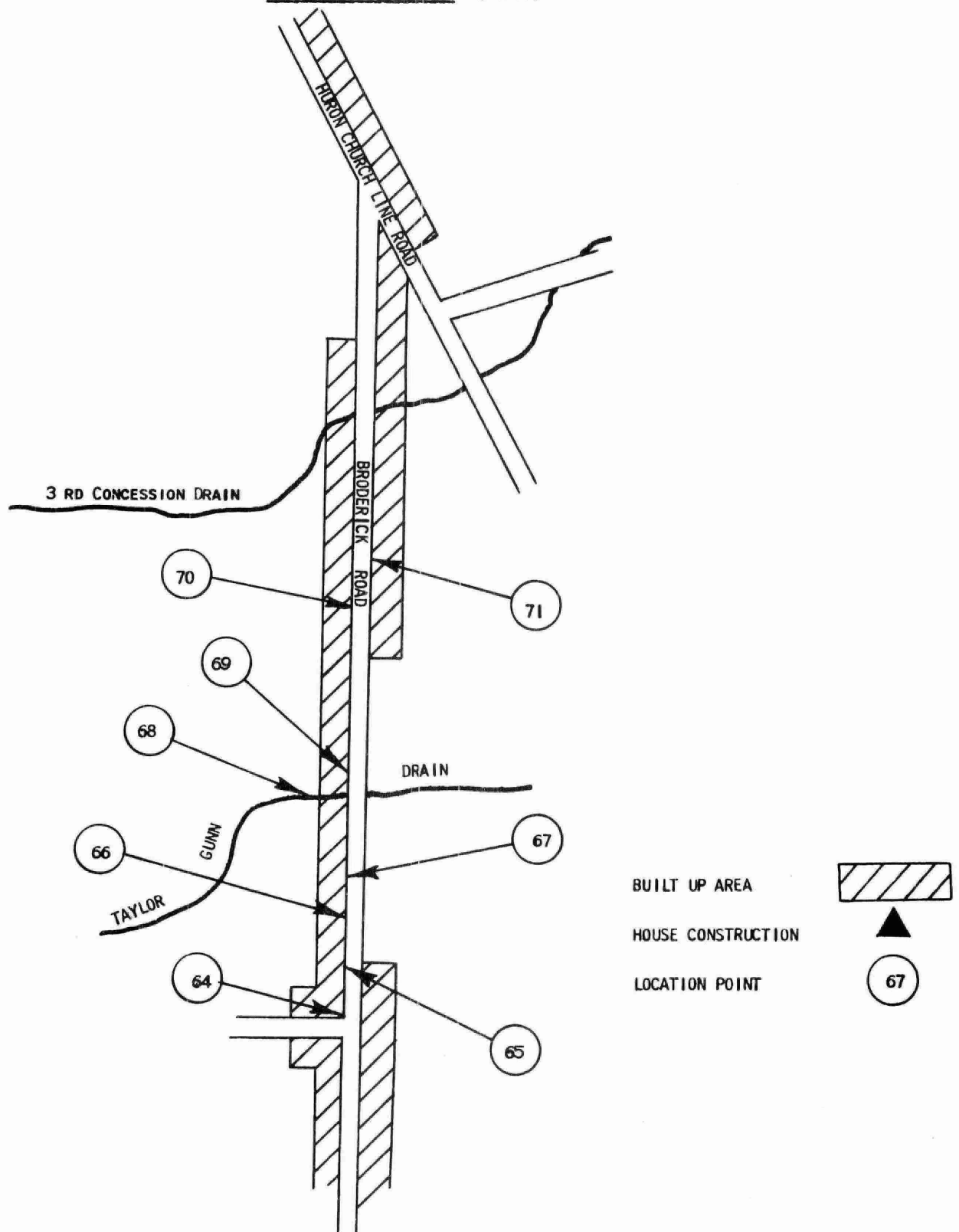
Drainage in the area is by open roadside ditches draining to a number of township drains which in turn drain to the Canard River.

It is felt that of the areas outside of the proposed sewer area, Broderick Road is the most polluted and presents the most serious health hazard.

Virtually every house on Broderick Road and North Town Line Road was equipped with a septic tank overflow which showed signs of recent use. The problem was particularly critical in the older area in the south. The severity of the situation may be observed in photographs #1 through #9 inclusive. Results of 18 samples taken from the ditches in the area confirm the degree of contamination, while the flow in the ditches was minimal or non-existent, the health hazard of this situation is obvious. Rainfall serves to convey any pollution in the ditches to the township drains which in turn discharge to the Canard River.

The servicing of this area with sanitary sewers at the present time, however, would not be economically feasible due to the relatively large spacing between the houses on Broderick Road and the excessive distance to the nearest trunk sewer.

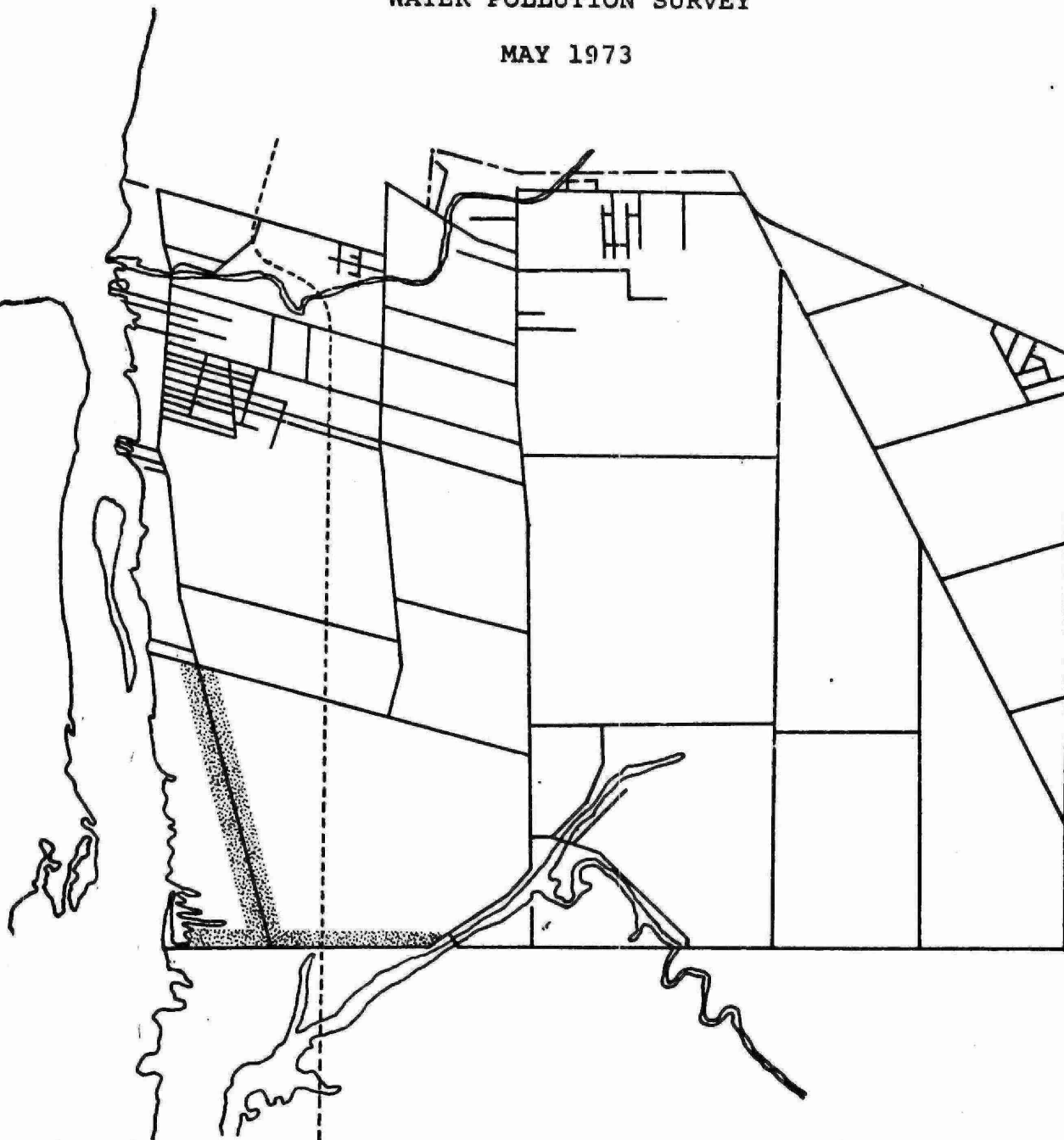
BRODERICK ROAD AREA

BRODERICK ROAD AREA: (CONTD)

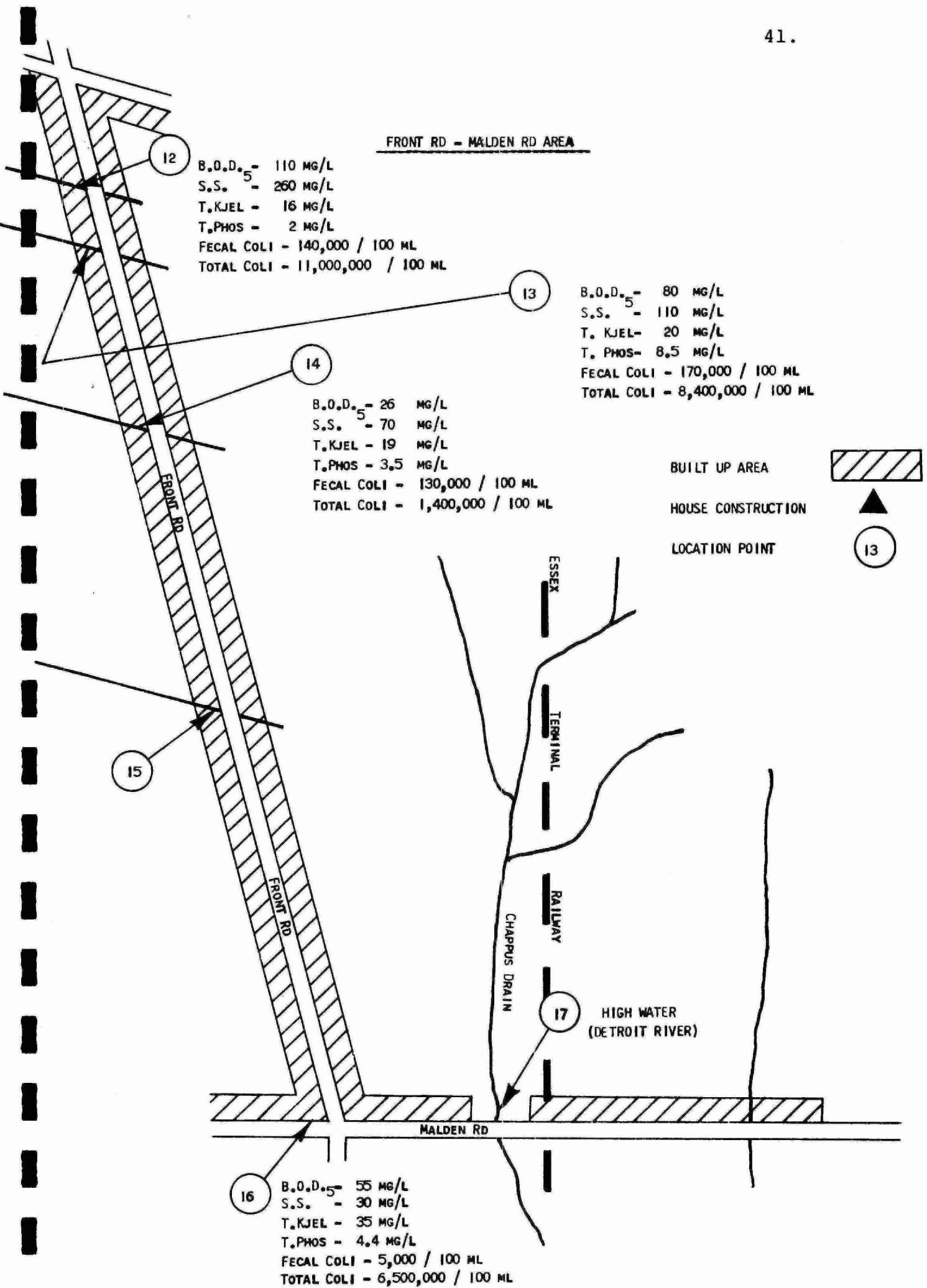
TOWNSHIP OF SANDWICH WEST

WATER POLLUTION SURVEY

MAY 1973



FRONT RD - MALDEN RD AREA



FRONT ROAD - MALDEN ROAD AREA

This area includes that part of Front Road not to be serviced as well as Malden Road from Front Road to the River Canard bridge. There are approximately 120 homes in this area.

Drainage is by way of open roadside ditches. Front Road ditches drain directly to the Detroit River while Malden Road ditches drain to either Chappus Drain to River Canard or to River Canard directly which ultimately discharges to the Detroit River.

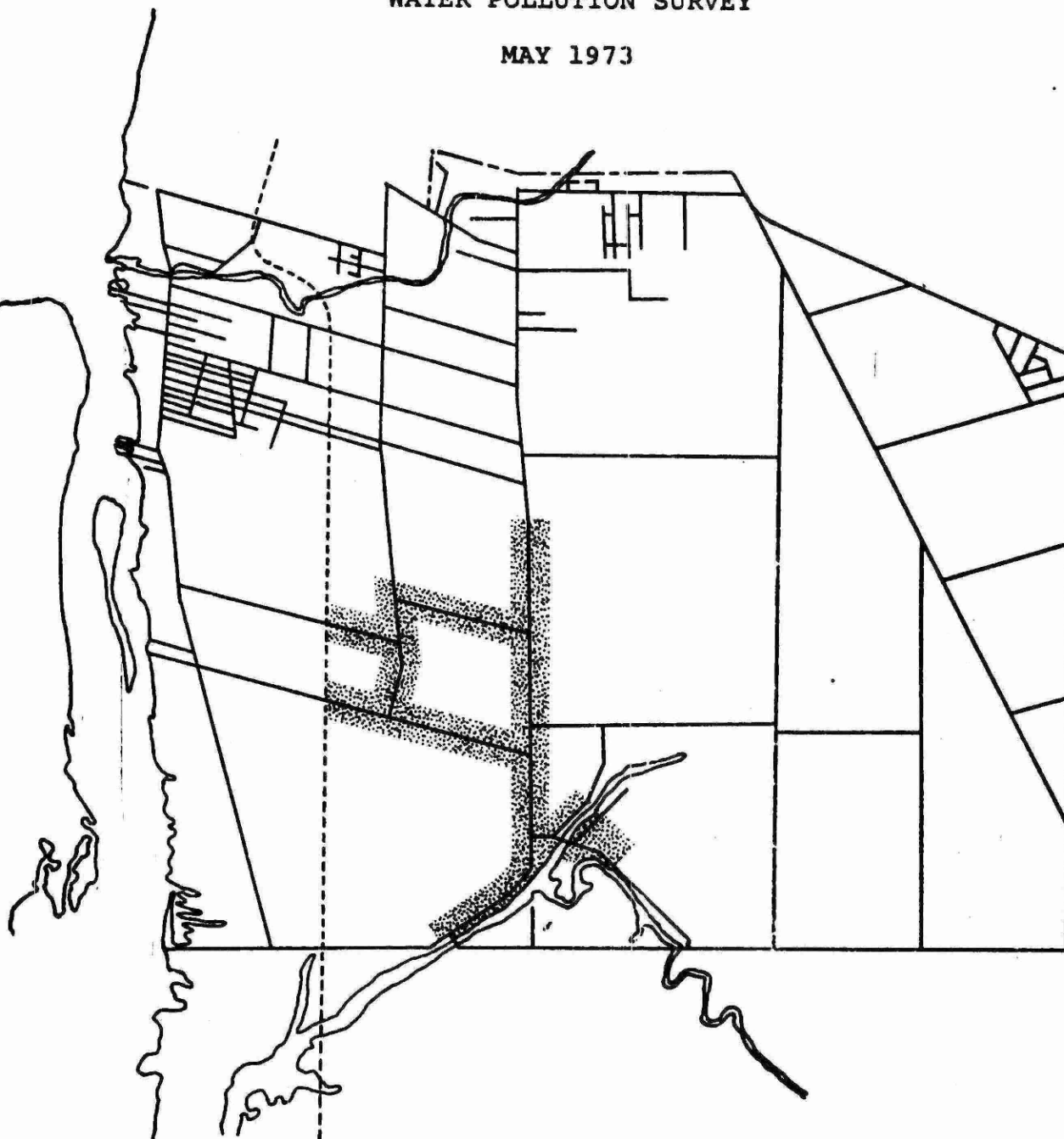
Several drains leading to the Detroit River from Front Road were sampled (location points number 12, 13, 14 and 16), all of which showed signs of substantial pollution from sanitary wastes, confirmed by sample analyses.

Chappus Drain was not sampled at Malden Road due to excessively high water levels caused by the Detroit River.

TOWNSHIP OF SANDWICH WEST

WATER POLLUTION SURVEY

MAY 1973



MALDEN RD - MARTIN LANE - GOLFVIEW - VICTORY ST AREA

MALDEN ROAD - GOLFVIEW DRIVE - VICTORY STREET AREA

This area comprises Malden Road from the south Township boundary at River Canard to the southerly extent of the proposed sanitary sewer, Golfview Drive and Victory Street from Matchette Road to the Essex Terminal Railway, as well as Martin Lane east of the railroad tracks.

Drainage in the area is generally by open drainage ditches with the exception of Golfview Drive which has sub-surface storm drainage.

The Deschatel Drain was sampled near the southerly extent of Malden Road. The drain had appearance of an open sewer with an estimated flow of 1 to 2 gpm, a distinct grey-black colour and a very strong sewage odour. Analyses results confirmed the severity of the above with a BOD₅ of 180 mg/l, suspended solids of 60 mg/l, total kjeldahl of 48 mg/l, total phosphorus of 7.6 mg/l, fecal coliforms of 90,000/100 ml, and total coliforms of 12,700,000/100 ml.

In consideration of both the flow and the strength of the wastes in the drain, it is felt that this is a significant problem both from a water pollution and health hazard standpoint.

The houses on Golfview Drive are relatively new and drainage on the street is sub-surface. The storm sewers discharge to Chappus Drain under the street making sampling and observation impossible for the north sewers. The south sewers are partially submerged in the drain, however, a net flow from the south-west sewer (location point number 99) was sampled and indicated fecal contamination.

A drain (location point number 98: BOD₅ - 110 mg/l, Suspended solids - 60 mg/l, fecal coliforms - 16,000/100 ml, total coliforms 100,000,000/100 ml)

running behind the north homes on Golfview Drive having a flow estimated at 3/4 gpm was sampled. The results indicated significant pollution from sanitary wastes.

On Victory Drive, just east of the Essex Terminal Railway, a complex of two - 16 unit and one - 12 unit apartment buildings have been built.

The ditch behind the apartments was grey-white in colour and possessed a very strong sewage odour. Samples taken (location point number 125: BOD₅ - 95 mg/l, suspended solids - 70 mg/l, total kjeldahl - 29 mg/l, total phosphorus - 6.5 mg/l, fecal coliforms - 26,000/100 ml, total coliforms - 1,100,000/100 ml) of the ditch confirmed the presence of sanitary wastes, while no flow was visible in the ditch, the extremely large volume of discoloured and malodorous water in the ditch indicates a significant problem.

Bessett Drain which serves the southern half of Malden Road was sampled at the point where it crosses Malden Road just north of Martin Lane (location point number 103A: BOD₅ - 42 mg/l, suspended solids - 180 mg/l, fecal coliforms - 76,000/100 ml, total coliforms, 1,600,000/100 ml). Analyses of the samples taken showed contamination by sanitary wastes.

House construction was also underway in this area. Of particular interest is the construction of eight identical homes adjacent to each other on Malden Road at Martin Lane. These homes were at various stages of construction (location point number 102, photograph #26) from nearing completion to excavation for the foundation. This represents wholesale strip development, which presumably will be serviced by septic tanks equipped with overflows to the roadside ditches.

MALDEN ROAD - MARTIN LANE - GOLFVIEW - VICTORY ST AREA

B.O.D.₅ = 42 MG/L
 S.S. = 180 MG/L
 T.KJEL = 24 MG/L
 T.PHOS = 6.6 MG/L
 FECAL COLI = 76,000 / 100 ML
 TOTAL COLI = 1,600,000 / 100 ML

103
A

103
B

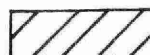
BESSETT DRAIN

MALDEN ROAD

MARTIN LANE

102

BUILT UP AREA



HOUSE CONSTRUCTION



LOCATION POINT

102

B.O.D.₅ = 180 MG/L
 S.S. = 60 MG/L
 T.KJEL = 48 MG/L
 T.PHOS = 7.6 MG/L
 FECAL COLI = 90,000 / 100 ML
 TOTAL COLI = 12,700,000 / 100 ML

18

DESHATEL DRAIN

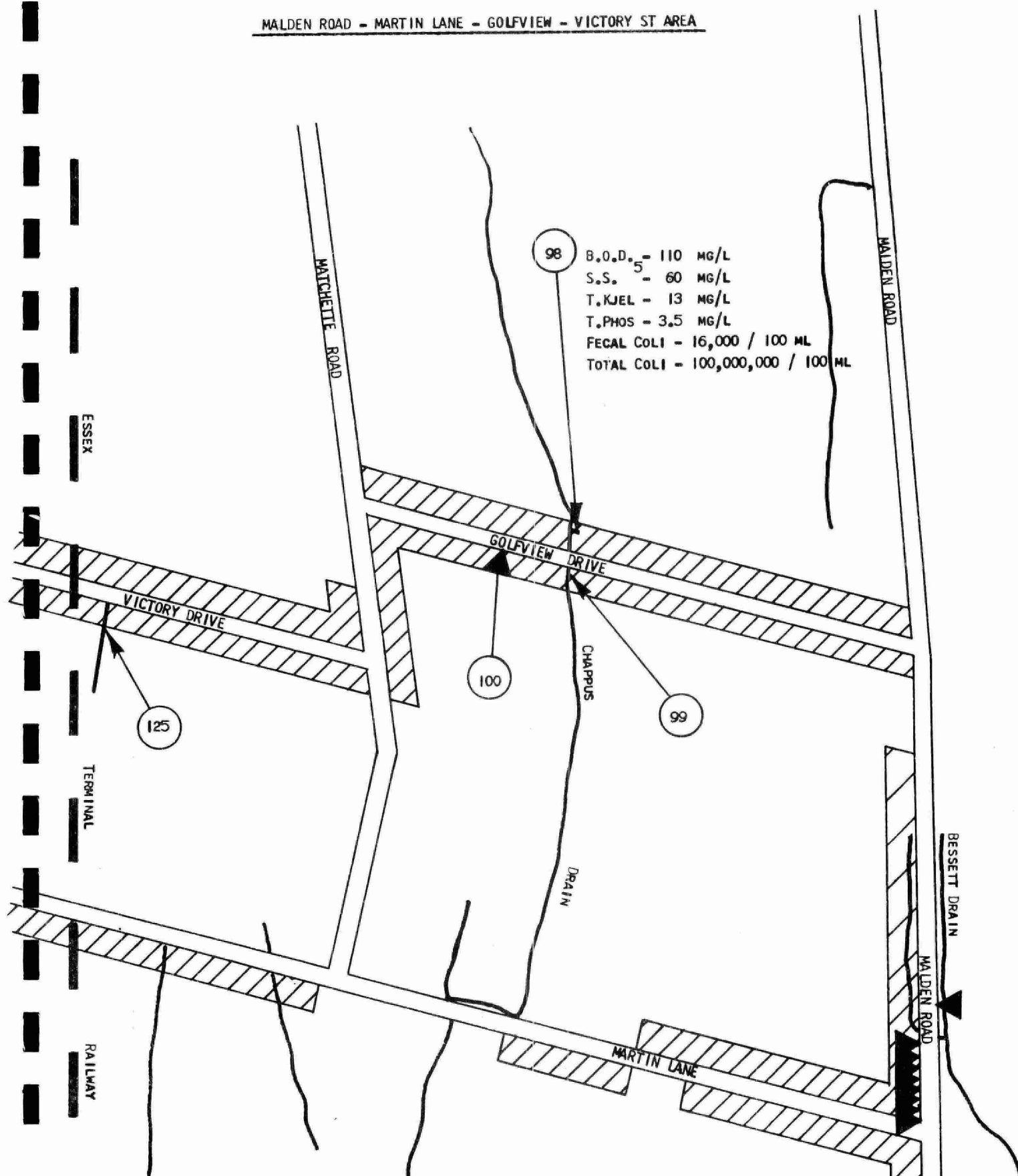
CANARD RIVER

126

ESSEX

TERMINAL

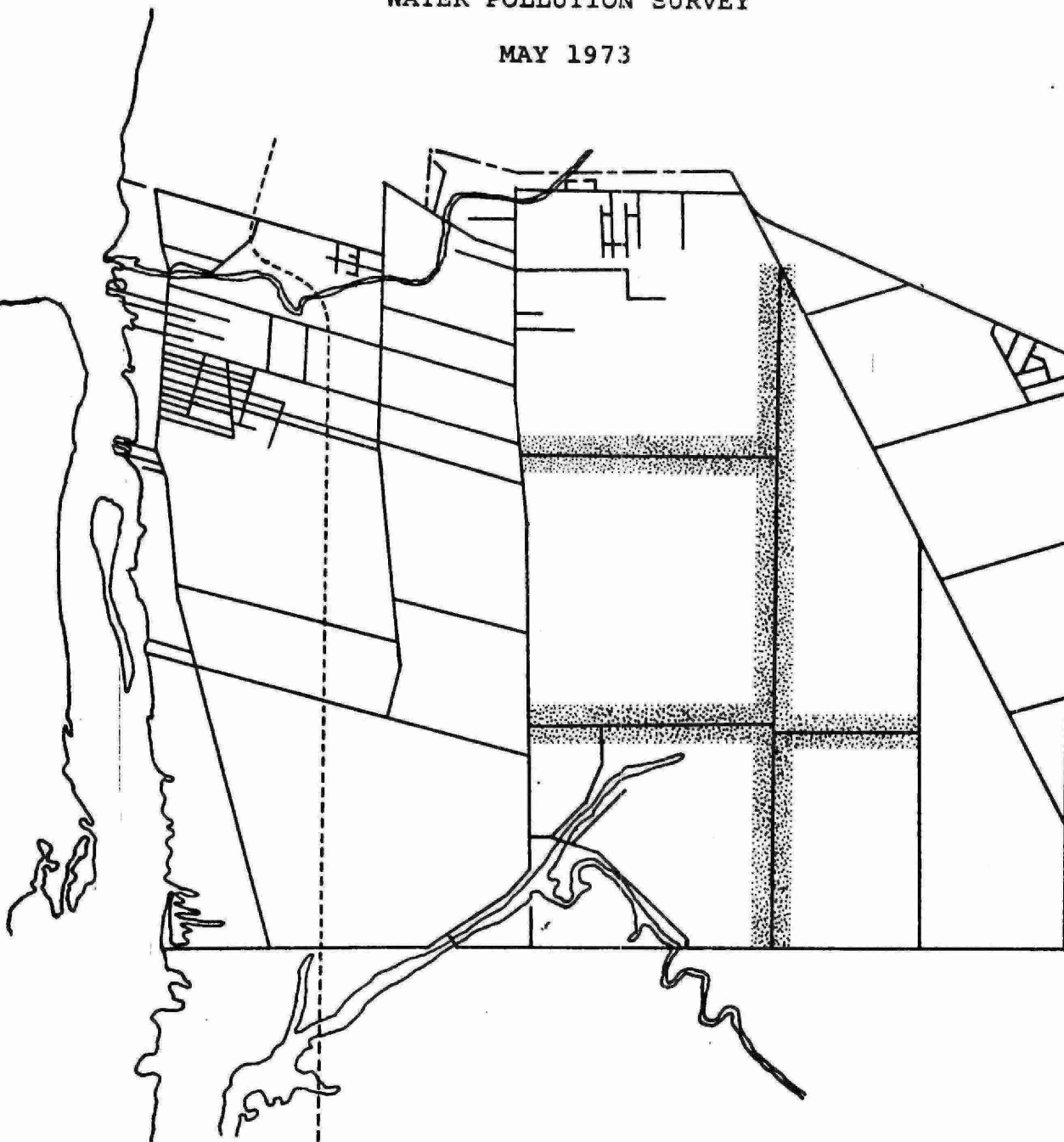
RAILWAY

MALDEN ROAD - MARTIN LANE - GOLFOVIEW - VICTORY ST AREA

TOWNSHIP OF SANDWICH WEST

WATER POLLUTION SURVEY

MAY 1973



DISPUTED ROAD AREA

DISPUTED ROAD - BOUFFARD ROAD AREA

This area consists of Disputed Road and the developed areas on Bouffard Road and contains approximately 100 homes.

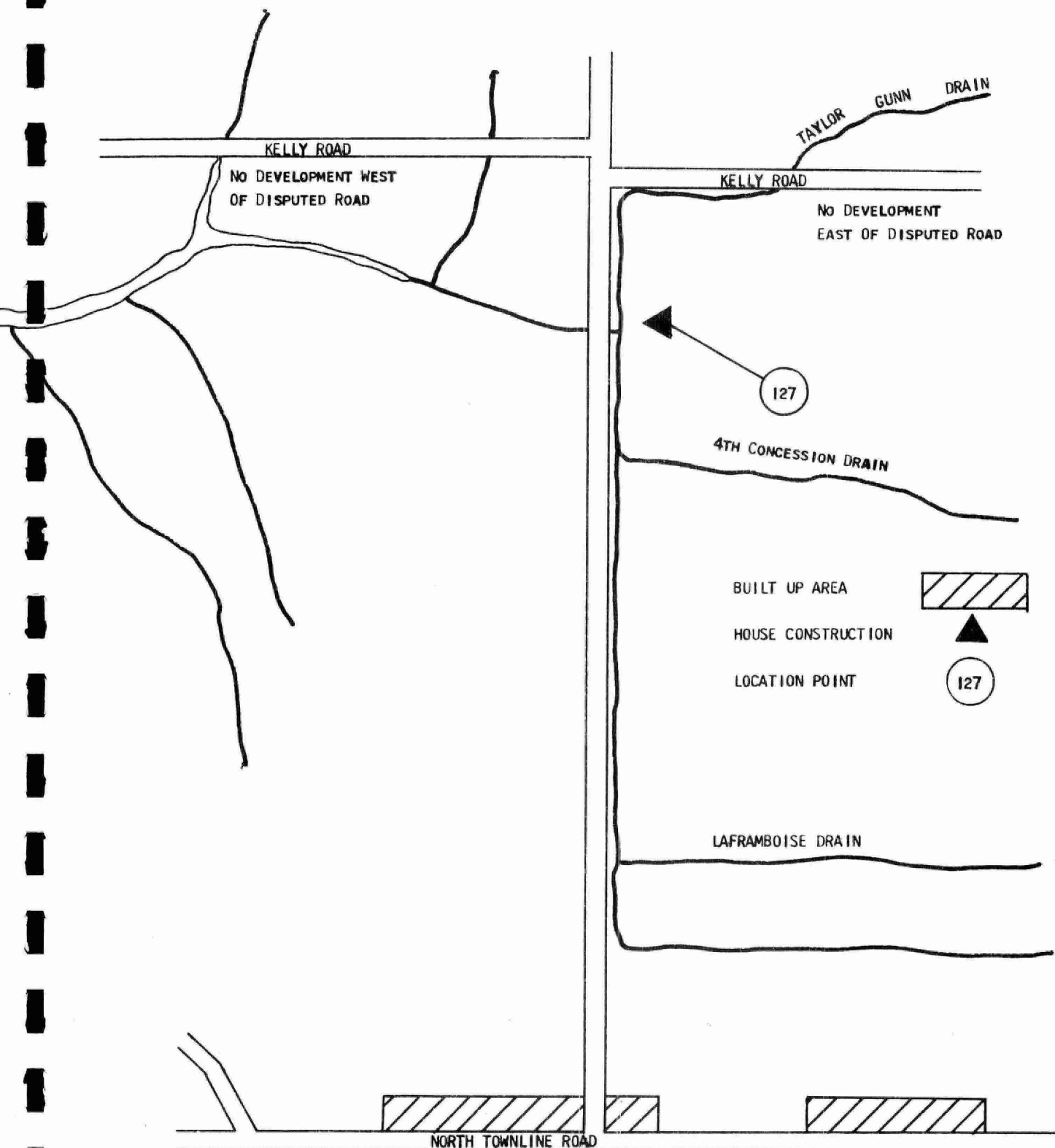
Drainage within the area is entirely by open roadside ditches to township drains.

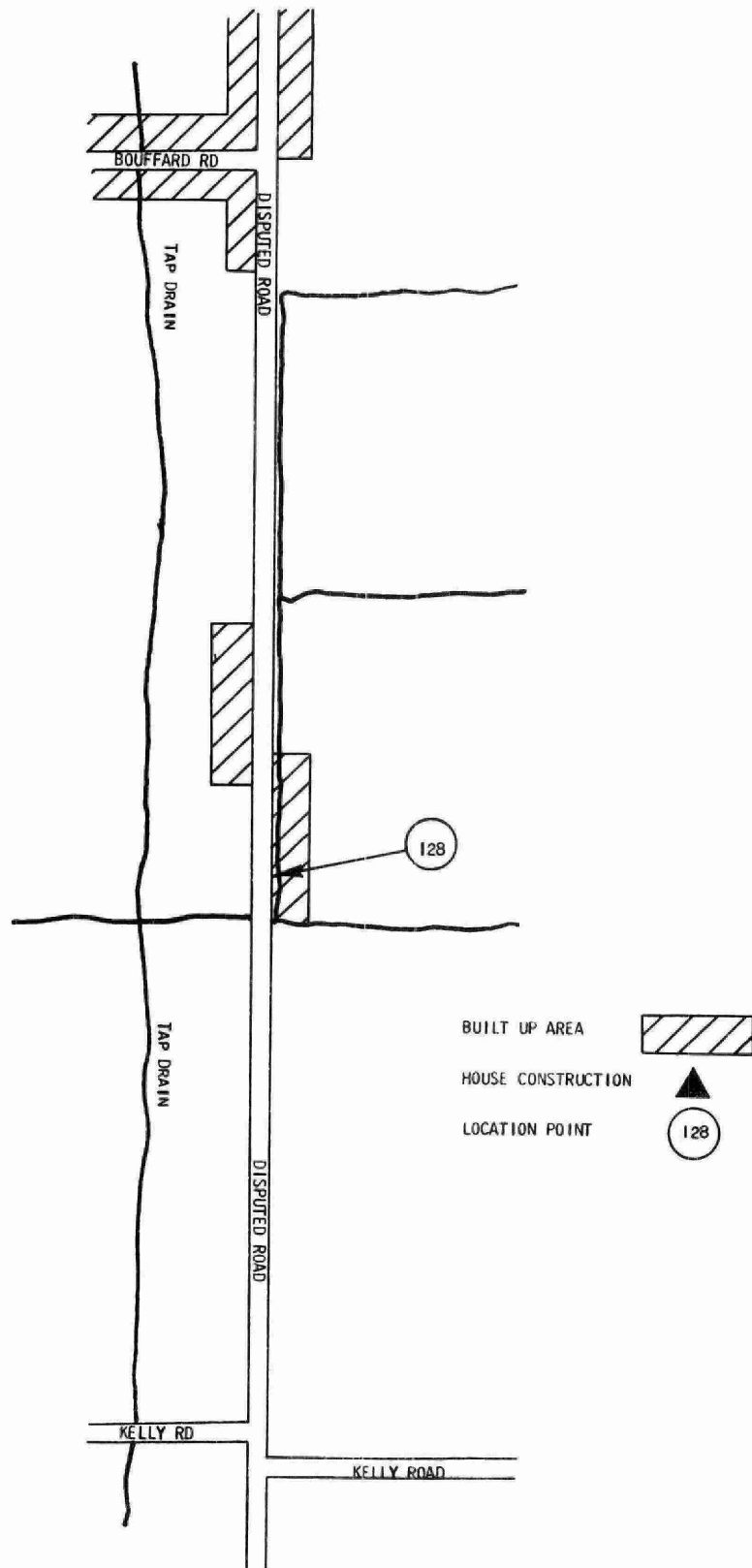
Samples taken from the drains and ditches serving Bouffard Road indicate the presence of some contamination from sanitary wastes. Analyses of samples taken showed moderate concentrations of the parameters indicating pollution.

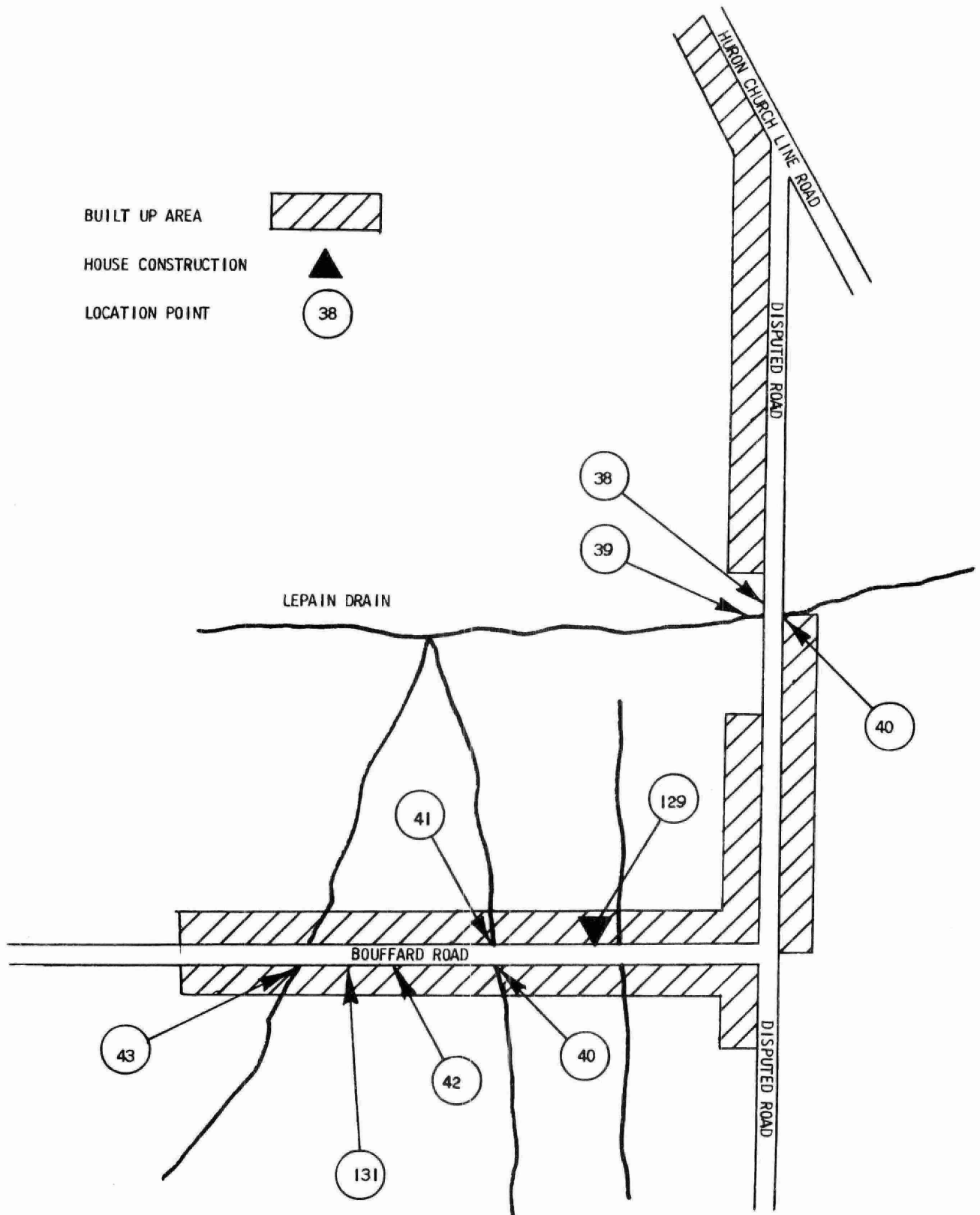
Ditches and drains serving the development just north of Bouffard Road on Disputed Road were observed, with no significant flows or ponding and as such, samples were not collected.

A septic tank overflow from a home on Disputed Road between the 6th and 3rd Concession drains was observed to be discharging and the sample of the effluent was taken (location point number 128: BOD₅ - 85 mg/l, suspended solids - 10 mg/l, total kjeldahl - 22 mg/l, total phosphorus - 5.5 mg/l, fecal coliforms - 8,000/100 ml and total coliforms - 2,200,000/100 ml).

House construction was noted to be underway on Bouffard Road, which will presumably be serviced by a septic tank.

DISPUTED ROAD AREA

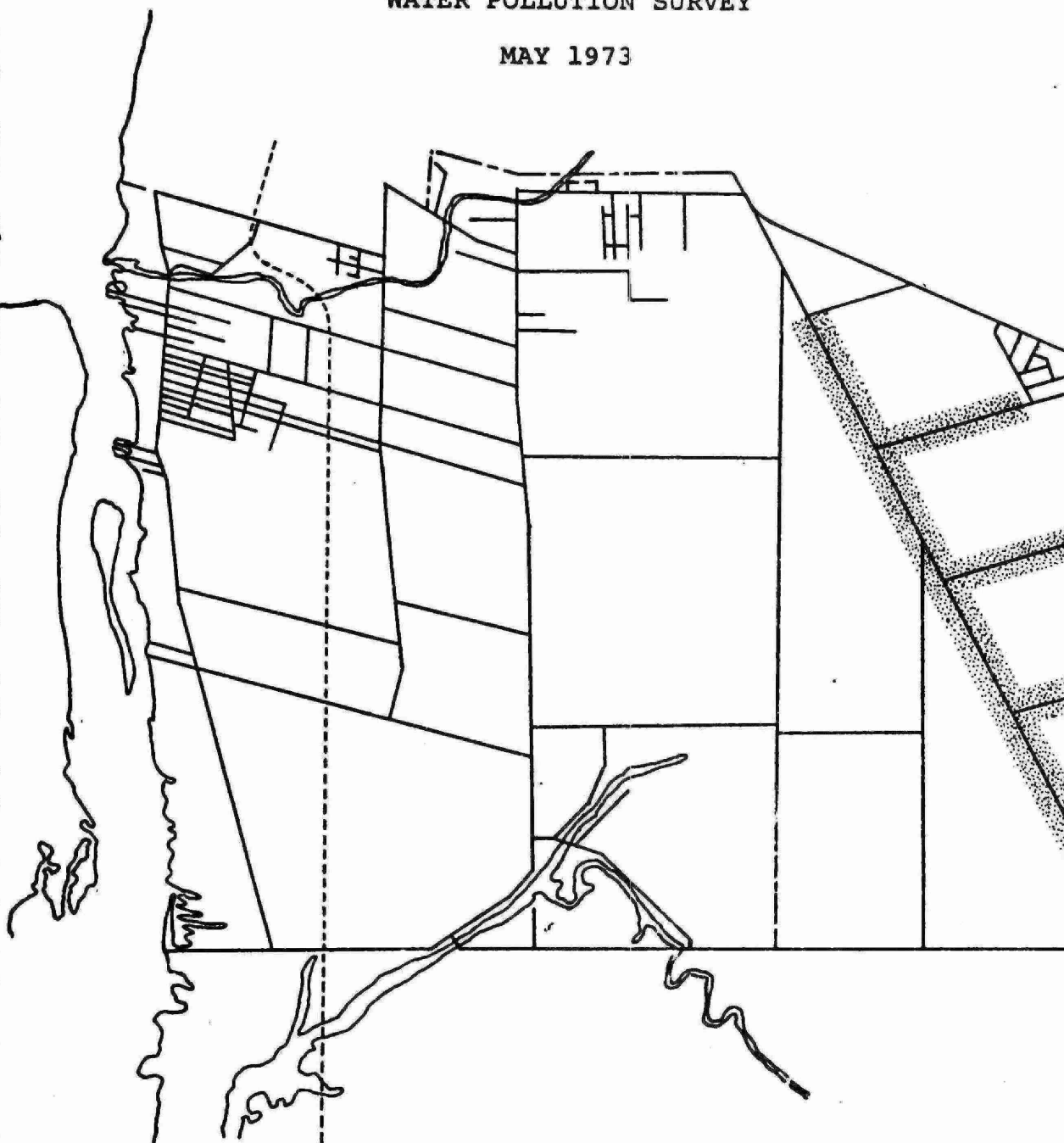


DISPUTED ROAD AREA

TOWNSHIP OF SANDWICH WEST

WATER POLLUTION SURVEY

MAY 1973

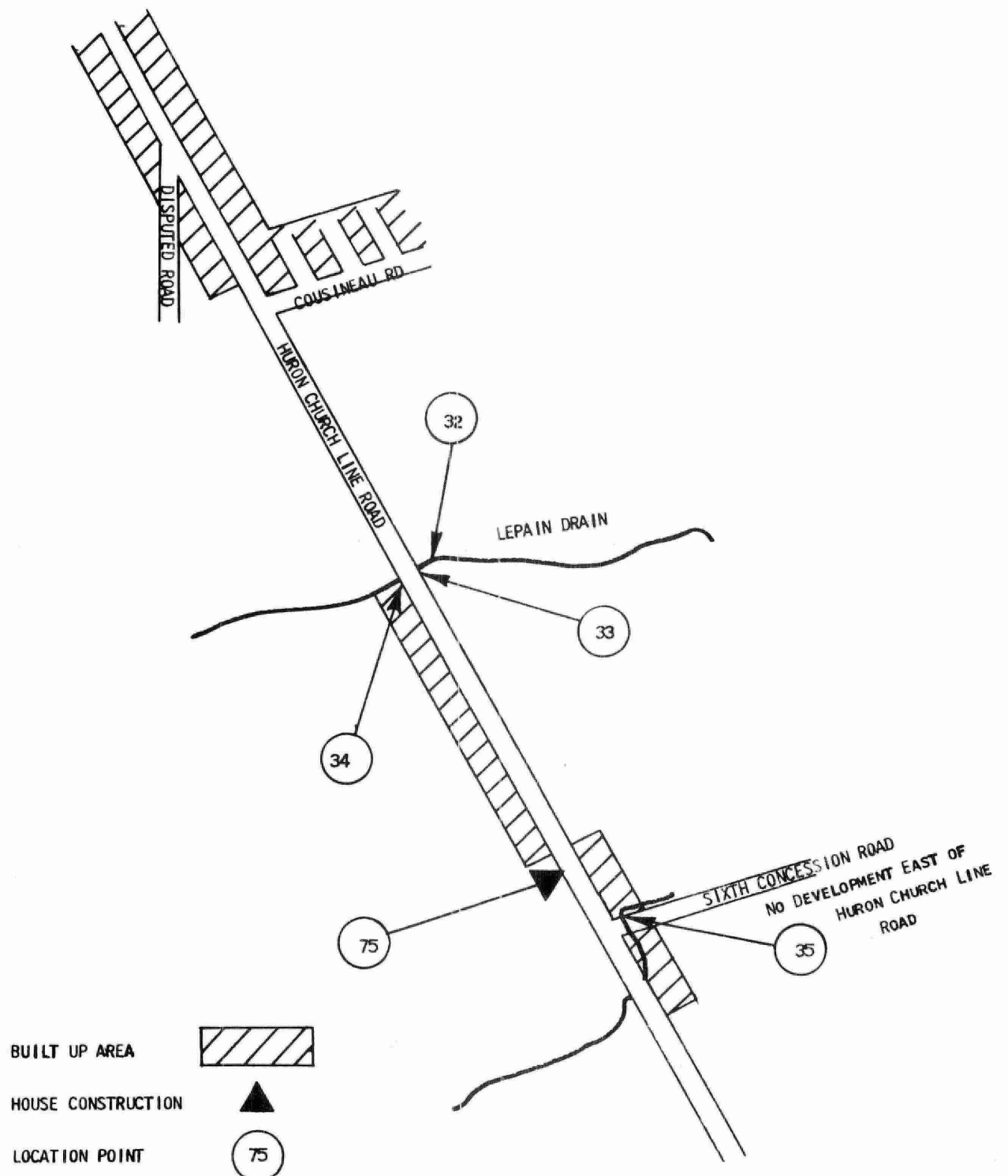
HURON CHURCH LINE ROAD AREA

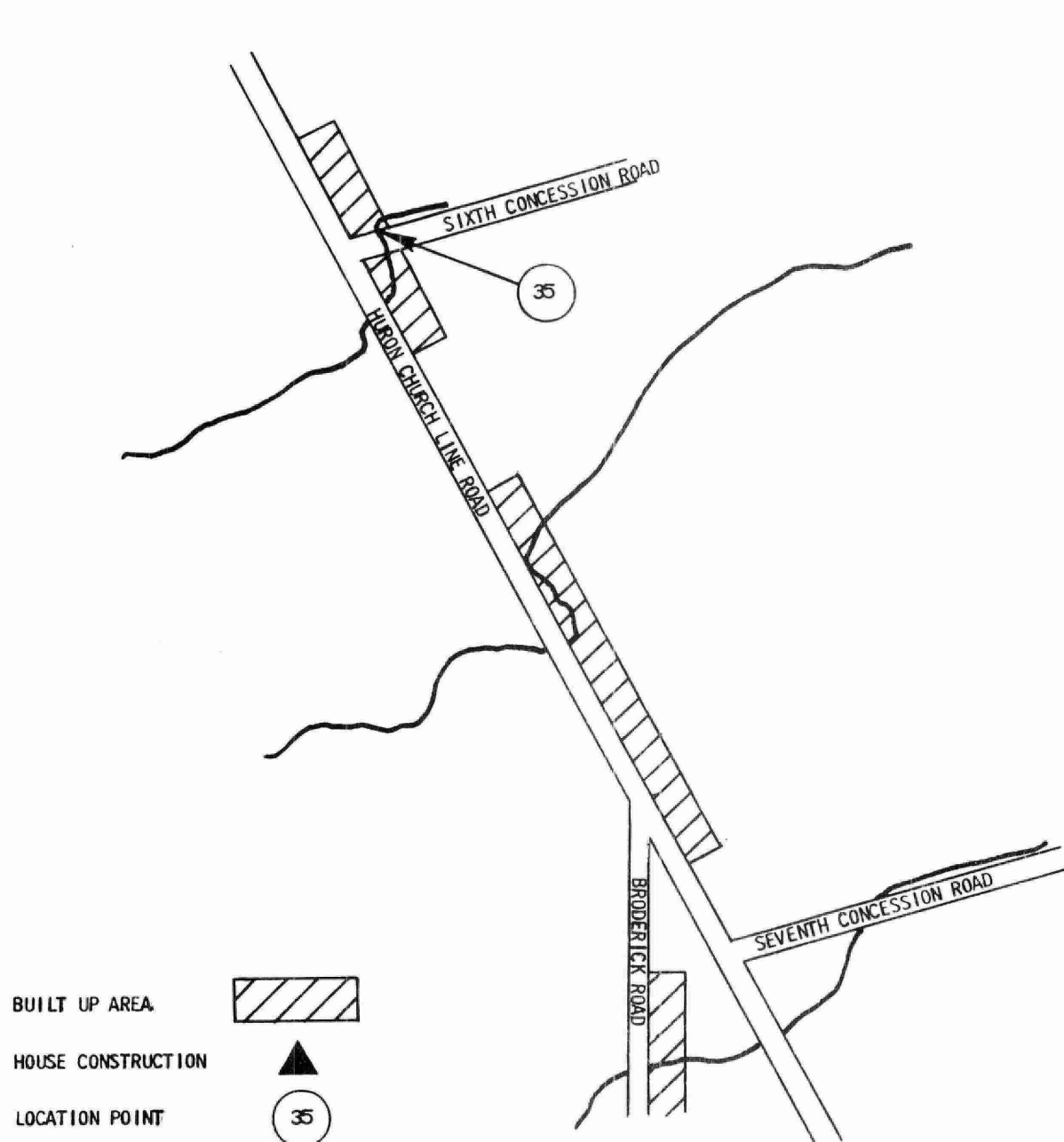
HURON CHURCH LINE ROAD

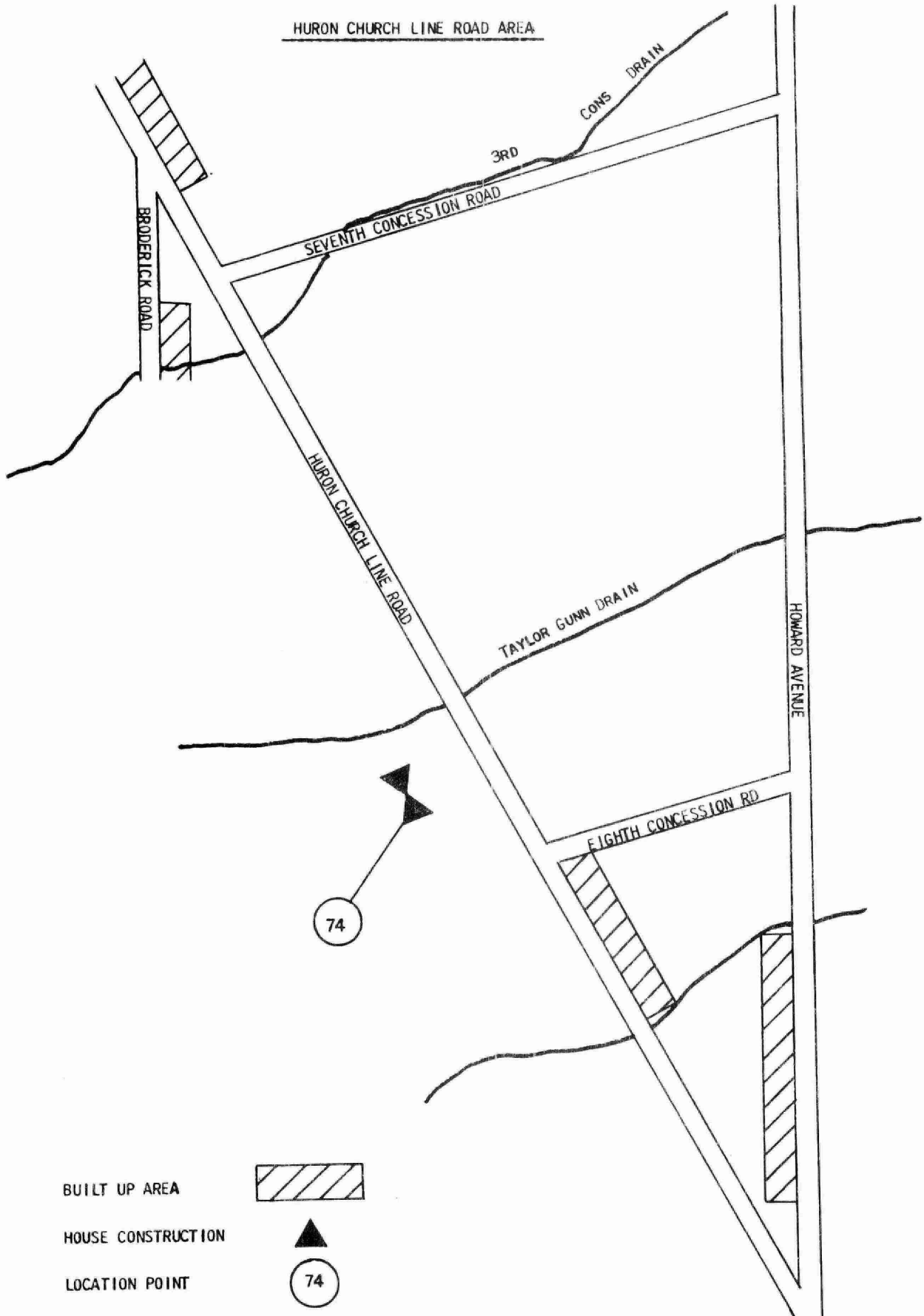
This will include the part of Huron Church Line Road where sewers are not proposed, and the extreme southerly extent of Howard Avenue.

While there is some indication of pollution in the ditches draining this area, it is not considered serious relative to the remainder of the township.

One house was noted to be under construction (location point number 75) and two houses had been built (location point number 74) since the aerial photographs were taken in the summer of 1972.

HURON CHURCH LINE ROAD AREA

HURON CHURCH LINE ROAD AREA



CONCLUSIONS
AND
RECOMMENDATIONS

CONCLUSIONS

It is concluded that gross water pollution exists in virtually every drain, ditch and watercourse in the Township of Sandwich West. This can be attributed to the malfunction of septic tank systems caused by poor soil conditions and/or high water table which results in an effluent being discharged to the drainage ditches or storm sewers either by way of the tile bed system or aided by "relief overflows" installed to alleviate backyard ponding during rainfall.

The proposed sanitary sewer system can indeed be confirmed as necessary to alleviate water pollution and health hazards in the Township. The extent of the proposed sewer system is restricted to the north and western regions of the Township by the enormous costs associated with extending the system to other areas due to the strip nature of development.

RECOMMENDATIONS

1. Provincial sewage works project #1-0206-69 for the construction of sanitary sewers in the Township of Sandwich West should be expedited by all concerned parties, to alleviate gross water pollution and other associated health hazards.
2. All dwelling construction and development in the Township should cease until the proposed sanitary sewers become operational. Development should then be confined to areas serviced by the sewers, and in accordance with accepted planning principles.
3. The Private Waste and Water Management Branch of this Ministry in co-operation with the Health Unit should study means of reducing the water pollution and related public health hazards caused by malfunctioning septic tank systems in the Township by the use of alternate disposal methods or by additional individual treatment.

This study should concentrate on but not be restricted to problem areas outside of the proposed sewer area. Significant problems exist within the proposed sewer area which require interim remedial action.

While the entire Township can be considered grossly polluted, there are some specific locations or areas, which by their exceptional nature should receive priority in investigation and correction on an individual basis. These are outlined as follows:

- (i) On Victory Avenue immediately east of the Essex Terminal Railway tracks, there exists three apartment buildings, two of these buildings contains 16 units and the third contains 8 units comprising a total of 40 units. The septic tank or tanks serving these buildings have failed and present a substantial point source of pollution. The septic tank effluent is gaining access to a large drainage ditch

located behind the complex. (Location point number 125:

BOD₅ - 95 mg/l, suspended solids - 70 mg/l, total kjeldahl - 29 mg/l, total phosphorus - 6.5 mg/l, fecal coliforms - 26,000/100 ml, total coliforms - 1,100,000/100 ml) Due to the high volume of grossly polluted water, remedial action should be taken to alleviate this situation. At the present time, these apartments are located outside the proposed sewer area.

- (ii) Deshatel Drain was sampled just north of Malden Road. The estimated flow in the drain of 1 to 2 gpm in combination with the analyses results (location point number 18: BOD₅ - 180 mg/l, suspended solids - 60 mg/l, total kjeldahl - 48 mg/l, total phosphorus - 7.6 mg/l, fecal coliforms - 90,000/100 ml, total coliforms - 12,700,000/100 ml) warrants remedial action at the source or sources.

- (iii) A tile on Bouffard Road approximately 1000 feet east of Front Road discharging domestic wastes was sampled (location point number 116: BOD₅ - 460 mg/l, suspended solids - 870 mg/l, total kjeldahl - 124 mg/l, total phosphorus - 18 mg/l, fecal coliforms - 120,000/100 ml, total coliforms - 60,000,000/100 ml). The analyses results confirm gross pollution. Visual observations of this tile (photograph #28) indicate a high volume and frequent discharge of wastes and as such should receive attention.

- (iv) The entire length of Broderick Road should be considered a serious problem area. The highest instance of gross water pollution outside of the proposed sewer area was found on Broderick Road. The specific

malfunctioning tile systems can be readily located due to the total failure of most of the systems. This may be attributed to the older nature of a great many homes in the area, plus the greater concentration of clay in the area.

Prepared by:.....*W. Gregson*.....

W. Gregson, Engineer
District Engineers Section
Sanitary Engineering Branch

/cs

A P P E N D I X I

SIGNIFIGANCE OF LABORATORY RESULTS

ABBREVIATIONS AND SYMBOLS

APPENDIX ISIGNIFICANCE OF LABORATORY RESULTS. ABBREVIATIONS AND SYMBOLS

All the laboratory tests included in this report were performed at the Ministry of the Environment laboratories in London.

A) BACTERIOLOGICAL EXAMINATION

TOTAL COLIFORM ORGANISMS include a wide variety of bacteria ranging from the genus (Group), *Escherichia Coli*, which originate mainly in the intestines of man and other warm-blooded animals, to the genera *Citrobacter* and *Enterobacter aerogenes*. The latter genera are basically found in soil but are also present in feces in small numbers.

The presence of total coliforms in water may indicate soil runoff or more important, less recent fecal pollution since organisms of the *Enterobacter* - *Citrobacter* groups tend to survive longer in water than do members of the *Escherichia Coli* group, and even to multiply when suitable environmental conditions exist.

The FECAL COLIFORM ORGANISMS are those coliform bacteria which are all intestinal origin and usually outnumber all other coliform types in human and animal intestines. Most of the coliform bacteria found by the fecal coliform test are of the genus *Escherichia Coli*. However, their death rate outside the warm body is the greatest and accordingly if the coliform present in the water are primarily fecal coliforms and their number is high, the pollution is probably nearby and recent. Smaller numbers but a high portion of fecal coliforms may indicate nearby pollution with counts reduced by dilution.

The results of the examinations are reported as "MF Coliform Count per 100 ml".

The Ministry's Guidelines and Criteria for Water Quality Management in Ontario (November 1972) indicate that water used for total body contact recreation can be considered impaired when the total coliform and/or fecal coliform geometric mean density exceeds 1000 and/or 100 per 100 ml respectively.

Note; the term "geometric mean" refers to a type of average; mathematically speaking, the geometric mean of a set of N numbers is the nth root of the product of the numbers; in practice, it is computed by the use of logarithms.

B) CHEMICAL ANALYSES

Biochemical Oxygen Demand

Biochemical Oxygen Demand (BOD) is reported in parts per million (ppm) and is an indication of the amount of oxygen required for the stabilization of the decomposable organic matter in water. The completion of the laboratory tests requires 5 days under the controlled incubation temperature of 20°C.

Biochemical oxygen demand directly affects the dissolved oxygen level within the watercourse, subsequently it must be limited in order to maintain dissolved oxygen levels in the receiving water to sustain the local aquatic life.

For warm water biota dissolved oxygen concentration should be above 5 mg/l at all times except in certain situations concentrations may range between 5 and 4 mg/l for short intervals within any 24 hour period provided that water quality is favourable in all other respects.

For cold water biota, dissolved oxygen levels should not be below 6 mg/l except in spawning areas where dissolved oxygen levels must not be below 7 mg/l at any time. In certain situations, dissolved oxygen levels may range between 6 and 5 mg/l for short intervals within any 24 hour period provided that water quality is favourable in all other respects.

Solids

The value for solids expressed in parts per million is the sum of the values for the suspended and dissolved matter in the water.

The concentration of suspended solids is generally the most significant of the solids analysis with regard to service water quality. The effects of suspended solids in water are reflected in difficulties associated with water purification, decomposition in streams, and injury to the habitat of fish. Substances should not be added to watercourses that will adversely affect the aquatic biota or will create objectionable deposits on the bottom or shore of any body of water.

Total Kjeldahl Nitrogen

Total Kjeldahl is a measure of the total nitrogenous matter present except that measured as nitrite and nitrate nitrogens. The Total Kjeldahl, less the ammonia nitrogen measures the organic nitrogen present. Ammonia and organic nitrogen determinations are important in determining the availability of nitrogen for the biological utilization.

The normal range in surface waters for Total Kjeldahl would be 0.1 to 0.5 ppm.

Phosphorus

Phosphorus is a major element of municipal sewage as well as septic tank seepage as the result of the utilization of synthetic detergents. In addition, agricultural runoff contains often high amounts of phosphorus due to the fact that fertilizers, used on the land, dissolve and leach into the drainage system.

To a certain extent, phosphorus is a highly desirable element in maintaining a proper balance between plant and animal life in water. However, excessive and prolonged discharges will upset this balance and create an over-abundance of algae, weeds and nuisance organisms. Excessive growth of algae have been found developing in lakes when the average concentrations of inorganic phosphorus was over 0.01 ppm.

C. Abbreviations and Symbols

BOD	-Biological Oxygen Demand
Susp. Solids	-Suspended Solids
Total Kjeldahl	-Total Kjeldahl Nitrogen
MF	-Membrane Filter
Ch	-32-ounce sample taken, and submitted for chemical analyses
Ba	-6-ounce sample taken, and submitted for bacteriological examination
ml	-Millilitre
mgd	-Million gallons per day
gpd	-gallons per day
gpm	-gallons per minute
<	-less than
>	-more than

A P P E N D I X I I

TOWNSHIP OF SANDWICH WEST

WATER POLLUTION SURVEY

SURVEY RESULTS

FIELD OBSERVATIONSWATER POLLUTION SURVEY

SHEET: A

TOWNSHIP OF SANDWICH WEST

MAY 1973

Sampling Point	Description of Sampling Point	Size of Outfall (Inches)	Kind of Outfall	Estimated Flow	Observations	Action	Day and Time of Sampling	Weather during Survey
1	Outfall to Nantais Drain - South Limit Canada Street	-	-	-	Did not locate	-	May 2 11:10 AM	Cloudy Dry
2	Fifth St. Drain at Normandy Street	-	Open drain	No estimate	Some algae growth noted	Ch/Ba	May 2 11:15 AM	Cloudy Dry
3	Trinity Ave. Drain at Normandy Street	-	Open drain	Nil	Ditch mainly dry - some minor ponding	-	May 2 11:20 AM	Cloudy Dry
4	Huron St. Outfall 42" Ø culvert to open ditch to Detroit River	42" Ø	-	No visible flow	Detroit River in drain - not representative	-	May 3 12:15 PM	Cloudy Dry
5	36"Ø culvert outfall to Detroit River south of Wahneta Avenue	36" Ø	-	-	Unable to locate - likely submerged by Detroit River	-	May 3 1:35 PM	Cloudy Dry
6	Catch basin at foot of Sunnyside	-	Catch basin	Nil	Grey black colour	Ch/Ba	May 3 1:45 PM	Cloudy Dry
7	Marenette Drain at Hwy. #18	-	Open drain	No visible flow	Detroit River in drain Not representative	-	May 3 1:55 PM	Cloudy Dry

TOWNSHIP OF SANDWICH WEST

Sampling Point	Description of Sampling Point	5-Day BOD (ppm)	Susp. Solids (ppm)	Total Kjeldahl (ppm)	Total Phosphorus (ppm)	Faecal Coliform Count per 100 ml.	MF Coliform Count per 100 ml.
1	Outfall to Nantais Drain - South Limit Canada Street						
2	Fifth St. Drain at Normandy Street	18	30	5.3	2.6	12	21,000
3	Trinity Ave. Drain at Normandy Street						
4	Huron St. Outfall - 42" Ø Culvert to open ditch to Detroit River						
5	36" Ø Culvert outfall to Detroit River south of Wahneta Avenue						
6	Catch basin at foot of Sunnyside	9.0	40	1.4	0.2	9,000	800,000
7	Marenette Drain at Hwy. #18						

FIELD OBSERVATIONSWATER POLLUTION SURVEY

SHEET: A

TOWNSHIP OF SANDWICH WEST

MAY 1973

Sampling Point	Description of Sampling Point	Size of Outfall (Inches)	Kind of Outfall	Estimated Flow	Observations	Action	Day and Time of Sampling	Weather during Survey
8	Lafferty Drain at Gary Street	-	Open Drain	-	-	-	-	-
9	Victoria Street outfall at Hwy, #18	-	Culvert to open drain	No estimate	Black colour Sewage odour	Ch/Ba	May 3 2:05 PM	Cloudy Dry
10	Outfall to open ditch to Detroit River just north of Begeron Garage	-	Covered drain to open ditch	No visible flow	Detroit River in drain - Not representative Outfall submerged	-	May 3 2:15 PM	Cloudy Dry
11	Open ditch - North side of Martin Lane	-	Open ditch	No visible flow	Detroit River in drain Not representative	-	May 3 2:55 PM	Cloudy Dry
12	Open drain between Lots 16 & 17 at Hwy. #18		Open drain	Sluggish flow No estimate	Milky white to grey colour - septic sewage odour	ch/ba	May 3 3:10 PM	Cloudy Dry
13	Open drain between Lots 15 & 16 at Hwy. #18 near Knights of Columbus Hall		Open drain	Sluggish flow No estimate	Grey-black colour Septic sewage odour	ch/ba	May 3 3:30 PM	Cloudy Dry
14	Open drain just north of 2802 Front Road at Hwy. #18		Open drain	No visible flow	Sewage odour - Fungus noted	ch/ba	May 3 3:45 PM	Cloudy Dry

TOWNSHIP OF SANDWICH WEST

Sampling Point	Description of Sampling Point	5-Day BOD (ppm)	Susp. Solids (ppm)	Total Kjeldahl (ppm)	Total Phosphorus (ppm)	Faecal Coliform Count per 100 ml.	MF Coliform Count per 100 ml.
8	Lafferty Drain at Gary St.						
9	Victoria Street Outfall at Hwy. #18	14	10	6.1	2.1	60,000	8,100,000
10	Outfall to open ditch to Detroit River just north of Begeron Garage						
11	Open ditch - north side of Martin Lane						
12	Open drain between Lots 17 & 16 at Hwy. #18	110	260	16	2.0	140,000	11,000,000
13	Open drain between Lots 15 & 16 at Hwy. #18 near Knights of Columbus Hall	80	110	20	8.5	170,000	8,400,000
14	Open Drain just north of 2802 Front Road at Hwy. #18	26	70	19	3.5	130,000	1,400,000

FIELD OBSERVATIONS

WATER POLLUTION SURVEY

SHEET: A

TOWNSHIP OF SANDWICH WEST

Sampling Point	Description of Sampling Point	Size of Outfall (Inches)	Kind of Outfall	Estimated Flow	Observations	Action	Day and Time of Sampling	Weather during Survey
15	Monforton Drain just east of Bonots Dump	-	-	-	Unable to locate	-	May 3 3:50 PM	Cloudy Dry
16	Malden Road at Front St.	-	Open ditch	Nil	Grey-black colour Sewage odour	ch/ba	May 3 3:55 PM	Cloudy Dry
17	Chappus Drain at Malden Road	-	Open drain	No visible flow	Detroit River in drain Not representative	-	May 3 4:00 PM	Cloudy Dry
18	Deshatel Drain just north of Malden Road	-	Open ditch	1 - 2 gpm	Grey-black colour Very strong sewage odour	ch/ba	May 3 4:20 PM	Cloudy Dry
19	Grand Marais Drain at Todd Street	-	Open drain	No estimate	No abnormality noted - Not relevant to Sandwich West Survey	-	May 3 8:45 AM	Cloudy Dry
20	Todd Street outfall to Grand Marais Drain	10-16" corrugated steel	Partially submerged	No visible flow	Due to partially submerged nature Sample would not be representative	-	May 3 8:45 AM	Cloudy Dry
21	Lennon Drain at Malden Road	-	-	-	-	-	-	-

TOWNSHIP OF SANDWICH WEST

Sampling Point	Description of Sampling Point	5-Day BOD (ppm)	Susp. Solids (ppm)	Total Kjeldahl (ppm)	Total Phosphorus (ppm)	Faecal Coliform Count per 100 ml.	MF Coliform Count per 100 ml.
15	Monforton Drain just east of Bonots Dump						
16	Malden Road at Front Street	55	30	35	4.4	5,000	6,500,000
17	Chappus Drain at Malden Rd.						
18	Deshatel Drain just north of Malden Road	180	60	48	7.6	90,000	12,700,000
19	Grand Marais Drain at Todd Street						
20	Todd Street outfall to Grand Marais Drain						
21	Lennon Drain at Malden Road						

FIELD OBSERVATIONSWATER POLLUTION SURVEY

SHEET: A

TOWNSHIP OF SANDWICH WEST

MAY 1973

Sampling Point	Description of Sampling Point	Size of Outfall (Inches)	Kind of Outfall	Estimated Flow	Observations	Action	Day and Time of Sampling	Weather during Survey
22	Catch basin on Riverview Street	-	Catch basin	1 - 2 gpm	Slight oil film Clear flow	ch/ba	May 3 10:30 AM	Cloudy Dry
23	Surrey Drive Outfall - Oliver Project	-	Free flowing outfall	5 - 10 gpm	Sanitary sewage odour		May 10/72 9:00 AM	Sunny Dry
24	Cahill Drain at Huron Line	-	-	-	-	-	-	-
25	Lennon Drain at Huron Line	-	-	-	Drains City of Windsor See Sample Point 80	-	-	-
26	Lafferty Drain at Delaware Avenue	-	-	-	-	-	-	-
27	Catch basin - south-east corner Laurier Drive and Front Street	-	Catch basin	No visible flow	Grey-black colour Sewage odour	ch/ba	May 3 12:35 PM	Cloudy Dry
28	Catch basin - north-east corner Kenwood Blvd. and Front Street	-	Catch basin	No visible flow	Grey-black colour Sewage odour	ch/ba	May 3 12:45 PM	Cloudy Dry

TOWNSHIP OF SANDWICH WEST

Sampling Point	Description of Sampling Point	5-Day BOD (ppm)	Susp. Solids (ppm)	Total Kjeldahl (ppm)	Total Phosphorus (ppm)	Faecal Coliform Count per 100 ml.	MF Coliform Count per 100 ml.
22	Catch basin on Riverview Street	2.6	5	1.1	0.2	L 4	1,000
23	Surrey Drive outfall Oliver project						
24	Cahill Drain at Huron Line						
25	Lennon Drain at Huron Line						
26	Lafferty Drain at Delaware Avenue						
27	Catch basin - south-east corner Laurier Drive and Front Street	18	60	8.6	1.3	280,000	1,700,000
28	Catch basin - north-east corner Kenwood Blvd. and Front Street	34	40	10	2.4	430,000	3,200,000

TOWNSHIP OF SANDWICH WEST

Sampling Point	Description of Sampling Point	5-Day BOD (ppm)	Susp. Solids (ppm)	Total Kjeldahl (ppm)	Total Phosphorus (ppm)	Faecal Coliform Count per 100 ml.	MF Coliform Count per 100 ml.
29	Catch basin - south-east Boismier Avenue - Front St.	60	80	12	3.2	500,000	11,100,000
30	Catch basin -south-east corner Lafferty Avenue and Front Street	60	70	22	7.2	80,000	18,000,000
31	Catch basin - south-east corner Superior Street - Front Street	8.0	20	2.6	0.4	16,000	1,600,000
32	Lepain Drain - eastside Huron Line - southside Lepain Drain	9.5	20	2.4	2.5	1,100	110,000
32	Lepain Drain just east of Huron Line	4.0	L 5	1.2	1.2	1,370	93,000
33	Roadside Ditch - eastside Huron Line Southside Lepain Drain						

FIELD OBSERVATIONS

WATER POLLUTION SURVEY

SHEET: A

TOWNSHIP OF SANDWICH WEST

MAY 1973

Sampling Point	Description of Sampling Point	Size of Outfall (Inches)	Kind of Outfall	Estimated Flow	Observations	Action	Day and Time of Sampling	Weather during Survey
34	Roadside ditch - west-side Huron Line -south-side Lepain Drain	-	Open ditch	2 - 4 gpm	Some foaming noted	ch/ba	May 4 11:35 AM	Cloudy Dry
34	Roadside ditch westside Huron Line - southside Lepain Drain	-	Ditch	2 gpm	Clear; algae growth; no deposits; drains developed strip	- ba	May 10/72 9:25 AM	Sunny Dry
35	6th Concession Drain just east of Huron Line	-	-	-	-	-	-	-
35	6th Concession Drain just east of Huron Line		Drain	2 - 5 gpm	Clear	-	May 10/72 9:35 AM	Sunny
36	Roadside ditch - west-side Disputed Road just south of Huron Line	-	Open ditch	Ponding	Sanitary sewage odour	-	May 10/72 9:40 AM	
37	Roadside ditch - south-side Lepain Drive - east side Disputed Road	8 - 10"	Covered road-side ditch drain	Moist but no flow	Slime and algae growth noted in pipe	-	May 4 10:30 AM	Cloudy Dry
37	Roadside ditch - south-side Lepain Drain - East side Disputed Road		Ditch	Trickle	Clear	-	May 10/72 9:50 AM	Sunny Dry

TOWNSHIP OF SANDWICH WEST

Sampling Point	Description of Sampling Point	5-Day BOD (ppm)	Susp. Solids (ppm)	Total Kjeldahl (ppm)	Total Phosphorus (ppm)	Faecal Coliform Count per 100 ml.	MF Coliform Count per 100 ml.
34	Roadside ditch -westside Huron Line - southside Lepain Drain	20	90	4.0	2.6	16	30,000
34	Roadside ditch west side Huron Line south side Lepain Drain	-	-	-	-	32	110
35	6th Concession Drain just east of Huron Line						
36	Roadside ditch westside Disputed Road just south of Huron Line						
37	Roadside ditch southside Lepain Drive - eastside Disputed Road						

FIELD OBSERVATIONSWATER POLLUTION SURVEY

SHEET: A

TOWNSHIP OF SANDWICH

MAY 1973

Sampling Point	Description of Sampling Point	Size of Outfall (Inches)	Kind of Outfall	Estimated Flow	Observations	Action	Day and Time of Sampling	Weather during Survey
38	Roadside ditch westside Disputed Road - south-side Lepain Drain	-	Open ditch	Dry	No adverse conditions noted	-	May 4 10:35 AM	Cloudy Dry
38	Roadside ditch; west side Disputed Road; south side Lepain Drain		Ditch	Dry	-	-	May 10/72 9:50 AM	Sunny Dry
39	Lepain Drain just west of Disputed Road	-	Open drain	15 - 20 gpm	Slight grey colour Slight sewage odour	ch/ba	May 4 10:40 AM	Cloudy Dry
39	Lepain Drain just west of Disputed Road		Drain	No estimate	Clear; some algae growth	ch/ba	May 10/72 9:50 AM	Sunny Dry
40	Cahill Drain east branch just south of Bouffard Road	-	Open drain	10 - 15 gpm	Scum and algae noted	ch/ba	May 4 9:40 AM	Cloudy Dry
40	Cahill Drain east branch just south of Bouffard Road		Drain	No estimate	Clear; some algae; faint smell of sanitary sewage	-	May 10/72 10:00 AM	Sunny Dry

TOWNSHIP OF SANDWICH WEST

Sampling Point	Description of Sampling Point	5-Day BOD (ppm)	Susp. Solids (ppm)	Total Kjeldahl (ppm)	Total Phosphorus (ppm)	Faecal Coliform Count per 100 ml.	MF Coliform Count per 100 ml.
38	Roadside Ditch westside Disputed Road - southside Lepain Drain						
39	Lepain Drain just west of Disputed Road	7.5	40	2.8	1.6	1,800	62,000
39	Lepain Drain just west of Disputed Road	4.6	L 5	1.0	1.0	1,290	90,000
40	Cahill Drain east branch just south of Bouffard Road	10	70	3.4	1.0	600	130,000

FIELD OBSERVATIONSWATER POLLUTION SURVEY

SHEET: A

TOWNSHIP OF SANDWICH WEST

MAY 1973

Sampling Point	Description of Sampling Point	Size of Outfall (Inches)	Kind of Outfall	Estimated Flow	Observations	Action	Day and Time of Sampling	Weather during Survey
41	Storm sewer outfall westside Cahill Drain, east branch; northside Bouffard Road	-	Free flowing type outfall	Intermittent dripping	Some foam noted in drain between outfall	-	May 4 9:45 AM	Cloudy Dry
41	Storm sewer outfall west side Bouffard Road between Cahill Drain East and West Branch		Free flowing outfall	Dripping	Smell of sanitary sewage; sewage fungi	-	May 10/72 10:00 AM	Sunny Dry
42	Roadside ditch south-side Bouffard Road between Cahill Drain East branch and west branch	-	-	-	See Sample Point 131	-	-	-
42	Roadside ditch south side Bouffard Road between Cahill Drain east branch and west branch		Ditch	Ponding	Sewage ponding in roadside ditch; health hazard	-	May 10/72 10:05 AM	Sunny Dry
43	Cahill Drain west branch just south of Bouffard Road				Some algae growth noted		May 4	Cloudy Dry

TOWNSHIP OF SANDWICH WEST

Sampling Point	Description of Sampling Point	5-Day BOD (ppm)	Susp. Solids (ppm)	Total Kjeldahl (ppm)	Total Phosphorus (ppm)	Faecal Coliform Count per 100 ml.	MF Coliform Count per 100 ml.
41	Storm sewer outfall westside Cahill Drain, east branch; northside Bouffard Road						
42	Roadside ditch southside Bouffard Road between Cahill Drain east branch and west branch						
43	Cahill Drain west branch just south of Bouffard Road	5.0	40	1.6	1.4	20	56,000
43	Cahill Drain west branch just south of Bouffard Road	3.0	10	0.6	0.6	1,200	140,000

FIELD OBSERVATIONSWATER POLLUTION SURVEY

SHEET: A

TOWNSHIP OF SANDWICH WEST

MAY 1973

Sampling Point	Description of Sampling Point	Size of Outfall (Inches)	Kind of Outfall	Estimated Flow	Observations	Action	Day and Time of Sampling	Weather during Survey
44	Nantais Drain just south of Washington Blvd. - next to Cavanaugh's Rest.	-	-	-	-	-	-	-
45	Nantais Drain 200 ft. north of Normandy Street at Sixth St. Extension	-	-	-	-	-	-	-
46	Manhole at southerly extension of Canada St. 200 ft. south of Delmar Street	-	Manhole	No visible flow	Grey-colour Slight sewage odour	ch/ba	May 3	Cloudy Dry
47	Storm sewer outfall to Nantais Drain at Ninth	-	-	-	See Sample Point 81	-	-	-
48	Nantais Drain just south of Todd Street	-	-	-	-	-	-	-
49	North Townline Road North ditch 1000 ft. west of Cty. Rd. #9	-	Open ditch	No visible flow	Some algae and fungus noted	ch/ba Photo #1	May 1 11:00 AM	Intermittent Rain
50	North Townline Road North ditch 1200 ft. west of Cty. Rd. #9	-	Open ditch	No visible flow	Algae growth noted	Photo #2	May 1 11:10 AM	Intermittent Rain

ANALYSES RESULTSWATER POLLUTION SURVEY

SHEET: B

TOWNSHIP OF SANDWICH WEST

Sampling Point	Description of Sampling Point	5-Day BOD (ppm)	Susp. Solids (ppm)	Total Kjeldahl (ppm)	Total Phosphorus (ppm)	Faecal Coliform Count per 100 ml.	MF Coliform Count per 100 ml.
44	Nantais Drain just south of Washington Blvd. - next to Cavanaugh's Rest..						
45	Nantais Drain 200 ft. north of Normandy St., at Sixth Street Extension						
46	Manhole at southerly extension of lanada St., 200 ft. south of Delmar Street	10	10	7.2	1.8	3,100	240,000
47	Storm sewer outfall to Nantais Drain at Ninth						
48	Nantais Drain just south of Todd Street						
49	North Townline Road north ditch 1000 ft. west of Cty. Rd. #9	34	50	27	3.3	1,600	25,000
50	North Townline Road north ditch 1200 ft. west of Cty. Rd. #9						

FIELD OBSERVATIONSWATER POLLUTION SURVEY

SHEET: A

TOWNSHIP OF SANDWICH WEST

MAY 1973

Sampling Point	Description of Sampling Point	Size of Outfall (Inches)	Kind of Outfall	Estimated Flow	Observations	Action	Day and Time of Sampling	Weather during Survey
51	North Townline Road north ditch 2000 ft. west of Cty. Rd. #9	-	Open ditch	No visible flow	Black colour Sewage odour	ba	May 1 11:20 AM	Intermittent Rain
52	North Townline Road north ditch 1500 ft. east of Broderick Road	-	Open ditch	No visible flow	Black colour with white streaks Strong sewage odour	ba Photo #3	May 1 11:45 AM	Intermittent Rain
53	North Townline Road north ditch 1200 ft. east of Broderick Road	-	Open ditch	No visible flow	Appearance similar to Photo #3 Sewage Odour	-	May 1 12:00 noon	Intermittent Rain
54	North Townline Road North ditch 1000 ft. east of Broderick Road	-	Open channel to roadside ditch	1/4 gpm	Black colour - foam scum & green slime noted	-	May 1 12:20 PM	Intermittent Rain
55	Laframboise Drain at Broderick Road	-	Open drain	1 - 2 gpm	Grey-black colour Evidence of sewage fungus at culvert under road	ch/ba	May 1 12:40 PM	Intermittent Rain
56	Broderick Road east ditch 1000 ft. north of Laframboise Drain	-	Open drain	No visible flow	Grey-black colour Foam and scum noted	ba	May 1 12:50 PM	Intermittent Rain

ANALYSES RESULTSWATER POLLUTION SURVEY

SHEET: B

TOWNSHIP OF SANDWICH WEST

Sampling Point	Description of Sampling Point	5-Day BOD (ppm)	Susp. Solids (ppm)	Total Kjeldahl (ppm)	Total Phosphorus (ppm)	Faecal Coliform Count per 100 ml.	MF Coliform Count per 100 ml.
51	North Townline Road north ditch 2000 ft. west of Cty. Rd. #9					420,000	1,300,000
52	North Townline Road north ditch 1500 ft. east of Broderick Road					40	400,000
53	North Townline Road north ditch 1200 ft. east of Broderick Road						
54	North Townline Road north ditch 1000 ft. east of Broderick Road						
55	Laframboise Drain at Broderick Road	30	110	18	0.9	99,000	3,900,000
56	Broderick Road east ditch 1000 ft. north of Laframboise Drain					110,000	1,100,000

FIELD OBSERVATIONSWATER POLLUTION SURVEY

SHEET: A

TOWNSHIP OF SANDWICH WEST

MAY 1973

Sampling Point	Description of Sampling Point	Size of Outfall (Inches)	Kind of Outfall	Estimated Flow	Observations	Action	Day and Time of Sampling	Weather during Survey
57	Broderick Road east ditch 1200 ft. north of Laframboise Drain	-	Open drain	Northerly flow - sluggish - difficult to estimate	Grey-black colour Foam and scum noted	ba Photo #4	May 1 1:05 PM	Intermittent Rain
58	Broderick Road west ditch at 4th Concession Drain	-	Open drain	7 - 8 gpm	Some foaming and scum noted	ch/ba	May 1 1:25 PM	Intermittent Rain
59	Broderick Road east ditch at 4th Concession Drain	-	Open drain	1/2 gpm	No abnormalities noted	ch/ba	May 1 1:40 PM	Intermittent Rain
60	Broderick Road east ditch 100 ft. north of 4th Concession Drain	-	Open ditch	No flow	Grey-black colour Some scum		May 1 1:55 PM	Intermittent Rain
61	Broderick Road west ditch 1300 ft. south of Kelly Road	-	Open ditch	No visible flow	Grey-black in colour	ba	May 1 2:10 PM	Intermittent Rain
62	Broderick Road west ditch 1100 ft. south of Kelly Road	-	Open ditch	No visible flow	Grey-black in colour	Photo #5	May 1 2:20 PM	Intermittent Rain

ANALYSES RESULTS

WATER POLLUTION SURVEY

SHEET: B

TOWNSHIP OF SANDWICH WEST

Sampling Point	Description of Sampling Point	5-Day BOD (ppm)	Susp. Solids (ppm)	Total Kjeldahl (ppm)	Total Phosphorus (ppm)	Faecal Coliform Count per 100 ml.	MF Coliform Count per 100 ml.
57	Broderick Road east ditch 1200 ft. north of Laframboise Drain					700,000	170,000,000
58	Broderick Road west ditch at 4th Concession Drain	3.2	10	0.6	0.1	L 4	6,000
59	Broderick Road east ditch at 4th Concession Drain	9.0	30	1.4	0.8	2,700	15,000
60	Broderick Road east ditch 100 ft. north of 4th Concession Drain						
61	Broderick Road west ditch 1300 ft. south of Kelly Road					28,000	3,900,000
62	Broderick Road west ditch 1100 ft. south of Kelly Road						

FIELD OBSERVATIONSWATER POLLUTION SURVEY

SHEET: A

TOWNSHIP OF SANDWICH WEST
MAY 1973

Sampling Point	Description of Sampling Point	Size of Outfall (Inches)	Kind of Outfall	Estimated Flow	Observations	Action	Day and Time of Sampling	Weather during Survey
63	Broderick Road west ditch 900 ft. south of Kelly Road	-	Open ditch	Trickle flow	Grey-black in colour	ba	May 1 2:30 PM	Intermittent Rain
64	Broderick Road west ditch at north side of Kelly Road	-	Open ditch	Sluggish flow - difficult to estimate	Grey-black in colour	ch/ba	May 1 2:45 PM	Intermittent Rain
65	Broderick Road west ditch 300 ft. north of Kelly Road	-	Open ditch	Sluggish flow - difficult to estimate	Foam and scum noted	ch/ba Photo #6	May 1 2:55 PM	Intermittent Rain
66	Broderick Road west ditch 1000 ft. north of Kelly Road	-	Open ditch	No visible flow	Grey-black colour Strong odour of sewage Foaming	ba	May 1 3:15 PM	Intermittent Rain
67	Broderick Road channel to west ditch	-	Open ditch	No visible flow	Grey-black colour Odour of sewage	ba Photo #7	May 1 3:25 PM	Intermittent Rain
68	Broderick Road Taylor Gunn Drain	-	Open drain	Difficult to estimate	Grey-black colour	ch/ba Photo #8	May 1 3:35 PM	Intermittent Rain

ANALYSES RESULTSWATER POLLUTION SURVEY

SHEET: B

TOWNSHIP OF SANDWICH WEST

Sampling Point	Description of Sampling Point	5-Day BOD (ppm)	Susp. Solids (ppm)	Total Kjeldahl (ppm)	Total Phosphorus (ppm)	Faecal Coliform Count per 100 ml.	MF Coliform Count per 100 ml.
63	Broderick Road west ditch 900 ft. south of Kelly Road					800,000	200,000,000
64	Broderick Road west ditch at northside of Kelly Road	40	80	22	4.6	13,000	8,300,000
65	Broderick Road west ditch 300 ft. north of Kelly Road	9.0	30	6.2	1.2	L 4	1,500
66	Broderick Road west ditch 1000 ft. north of Kelly Road					100	2,000,000
67	Broderick Road channel to west ditch					1,600,000	290,000,000
68	Broderick Road Taylor Gunn Drain	22	- Interference	3.6	0.6	700	15,000

FIELD OBSERVATIONSWATER POLLUTION SURVEY

SHEET: A

TOWNSHIP OF SANDWICH WEST

MAY 1973

Sampling Point	Description of Sampling Point	Size of Outfall (Inches)	Kind of Outfall	Estimated Flow	Observations	Action	Day and Time of Sampling	Weather during Survey
69	Broderick Road west ditch 100 ft. north of Taylor Gunn Drain	-	Open ditch	No visible flow	Grey-black colour Septic odour	ba	May 1 3:45 PM	Intermittent Rain
70	Broderick Road west ditch 1500 ft. north of Taylor Gunn Drain	-	Open ditch	No visible flow	Grey-black colour	ba	May 1 3:50 PM	Intermittent Rain
71	Broderick Road east ditch 1500 ft. south of 3rd Concession Drain	-	Open ditch	No visible flow	Grey-black colour Strong septic odour	ch/ba Photo #9	May 1 4:15 PM	Intermittent Rain
72	Montgomery Road at foot of Croydon Road	-	-	-	House construction - foundation and floor	Photo #10	May 2 9:00 AM	Cloudy Dry
73	Lepain Drain at Montgomery Road	24" Ø	Concrete pipe to open drain	15 - 20 gpm	Grey-black sewage fungus Strong sewage odour	Photo #11 #12 ch/ba	May 2 9:15 AM	Cloudy Dry
74	Huron Church Line Road at Cabot Drive	-	-	-	Additional development since 1972 aerial photos	Photo #13	May 2 9:45 AM	Cloudy Dry

ANALYSES RESULTSWATER POLLUTION SURVEY

SHEET: B

TOWNSHIP OF SANDWICH WEST

Sampling Point	Description of Sampling Point	5-Day BOD (ppm)	Susp. Solids (ppm)	Total Kjeldahl (ppm)	Total Phosphorus (ppm)	Faecal Coliform Count per 100 ml.	MF Coliform Count per 100 ml.
69	Broderick Road west ditch 100ft. north of Taylor Gunn Drain					76,000	7,000,000
70	Broderick Road west ditch 1500 ft. north of Taylor Gunn Drain					48,000	1,400,000
71	Broderick Road east ditch 1500 ft. south of 3rd Concession Drain	60	- Interference	20	5.0	700	140,000,000
72	Montgomery Road at foot of Croydon Road						
73	Lepain Drain at Montgomery Rd.	65	- Interference	15	5.0	1,000,000	17,000,000
74	Huron Church Line Road at Cabot Drive						

FIELD OBSERVATIONSWATER POLLUTION SURVEY

SHEET: A

TOWNSHIP OF SANDWICH WEST

MAY 1973

Sampling Point	Description of Sampling Point	Size of Outfall (Inches)	Kind of Outfall	Estimated Flow	Observations	Action	Day and Time of Sampling	Weather during Survey
75	Huron Church Line Road 500 ft. north of 6th Concession Road	-	-	-	House construction - foundation and some framing	Photo #14	May 2 9:55 AM	Cloudy Dry
76	Cousineau Road north ditch at Daytona Street	-	Open ditch	No visible flow	Grey-black colour Sewage odour	ch/ba Photo #15	May 2 10:00 AM	Cloudy Dry
77	Huron Church Line Road 500 ft. north of Cousineau Road - culvert	30" $\emptyset$	Corrugated steel	1 - 2 gpm	Grey-black colour Sewage fungus, Scum and foam Sewage odour	ch/ba	May 2 10:05 AM	Cloudy Dry
78	Huron Church Line Road 500 ft. north of Cousineau Road - west ditch	-	Open ditch	1/2 gpm	Grey-black colour Sewage fungus Scum and foam Sewage odour	ch/ba	May 2 10:10 AM	Cloudy Dry
79	Huron Church Line Road near Brooklyn Avenue	-	-	-	House construction - framing	Photo #16	May 2 10:20 AM	Cloudy
80	Huron Church Line Road South-east ditch to Lennon Drain	10" $\emptyset$	Steel Pipe	3 - 5 gpm	Grey colour foam	ch/ba	May 2 10:50 AM	Cloudy Dry

ANALYSES RESULTSWATER POLLUTION SURVEY

SHEET: B

TOWNSHIP OF SANDWICH WEST

Sampling Point	Description of Sampling Point	5-Day BOD (ppm)	Susp. Solids (ppm)	Total Kjeldahl (ppm)	Total Phosphorus (ppm)	Faecal Coliform Count per 100 ml.	MF Coliform Count per 100 ml.
75	Huron Church Line Road 500 ft. north of 6th Concession Road						
76	Cousineau Road north ditch at Daytona Street	130	150	46	16	610,000	2,300,000
77	Huron Church Line Road 500 ft. north of Cousineau Road - Culvert	60	30	29	8.4	76,000	15,000,000
78	Huron Church Line Road 500 ft. north of Cousineau Road - west ditch	80	220	12	4.1	80	120,000
79	Huron Church Line Road near Brooklyn Avenue						
80	Huron Church Line Road - south- east ditch to Lennon Drain	42	50	38	5.0	260,000	10,000,000

FIELD OBSERVATIONSWATER POLLUTION SURVEY

SHEET: A

TOWNSHIP OF SANDWICH WEST

MAY 1973

Sampling Point	Description of Sampling Point	Size of Outfall (Inches)	Kind of Outfall	Estimated Flow	Observations	Action	Day and Time of Sampling	Weather during Survey
81	Ninth Street Drain at Nantais Drain	-	Storm sewer	1/2 gpm	Grey-black colour Sewage odour	ch/ba	May 2 11:00 AM	Cloudy Dry
82	Storm sewer at foot of Oxley Avenue	16" ø	concrete storm sewer	6 - 8 gpm	Grey-black sludge in bottom of sewer Strong sewage odour	ch/ba	May 2 11:30 AM	Cloudy Dry
83	Todd Lane	-	-	-	House construction - Framing and siding complete	Photo #17	May 2 11:40 AM	Cloudy Dry
84	Hastings Drive southerly extent	-	-	-	House construction 2 - houses nearing completion	Photo #18	May 2 12:05 PM	Cloudy Dry
85	Orford Street east extension	-	-	-	House construction 1 - house nearing completion	Noted only	May 2 12:20 PM	Cloudy Dry
86	Suzanne Street	-	-	-	House construction	Photo #19	May 2 12:30 PM	Cloudy Dry

ANALYSES RESULTSWATER POLLUTION SURVEY

SHEET: B

TOWNSHIP OF SANDWICH WEST

Sampling Point	Description of Sampling Point	5-Day BOD (ppm)	Susp. Solids (ppm)	Total Kjeldahl (ppm)	Total Phosphorus (ppm)	Faecal Coliform Count per 100 ml.	MF Coliform Count per 100 ml.
81	Ninth Street Drain at Nantais Drain	13	60	7.5	1.6	24,000	8,000,000
82	Storm sewer at foot of Oxley Avenue	12	10	11	3.8	5,000	11,000,000
83	Todd Lane						
84	Hastings Drive southerly extent.						
85	Orford Street East extent.						
86	Suzanne Street						

FIELD OBSERVATIONSWATER POLLUTION SURVEY

SHEET: A

TOWNSHIP OF SANDWICH WEST

MAY 1973

Sampling Point	Description of Sampling Point	Size of Outfall (Inches)	Kind of Outfall	Estimated Flow	Observations	Action	Day and Time of Sampling	Weather during Survey
87	Stuart Blvd. south ditch	-	Open ditch	No visible flow	Milky-white colour	ch/ba Photo #20	May 2 12:35 PM	Cloudy Dry
88	Stuart Blvd. drain at LaSalle Street	-	Open ditch	No visible flow	Two septic tank overflows noted approx. 100 ft. downstream of sample point	ch/ba	May 2 12:50 PM	Cloudy Dry
89	Reaume Avenue 1000 ft. east of Matchette Road	-	-	-	House construction - framing nearly complete	Photo #21	May 2 1:05 PM	Cloudy Dry
90	Reaume Avenue north ditch 1000 ft. east of Matchette Road	-	Open ditch	No visible flow	Grey-black colour	ba	May 2 1:20 PM	Cloudy Dry
91	Reaume Avenue 1000 ft. east of Matchette Road	-	-	-	Two building lots noted to be for sale	-	May 2 1:35 PM	Cloudy Dry
92	Reaume Avenue midway between Matchette Road and Malden Road - north ditch	-	Open ditch	No visible flow	Grey-black colour	ba	May 2 2:00 PM	Cloudy Dry

ANALYSES RESULTSWATER POLLUTION SURVEY

SHEET: B

TOWNSHIP OF SANDWICH WEST

Sampling Point	Description of Sampling Point	5-Day BOD (ppm)	Susp. Solids (ppm)	Total Kjeldahl (ppm)	Total Phosphorus (ppm)	Faecal Coliform Count per 100 ml.	MF Coliform Count per 100 ml.
87	Stuart Blvd. south ditch	3,400	3,300	28	0.7	1,200	430,000
88	Stuart Blvd. drain at LaSalle Street	50	100	92	33	340	7,000
89	Reaume Avenue 1000 ft. east of Matchette Road						
90	Reaume Avenue north ditch 1000 ft. east of Matchette Road					80,000	48,000,000
91	Reaume Avenue 1000 ft. east of Matchette Road						
92	Reaume Avenue midway between Matchette Road and Malden Road - North Ditch					7,000	9,000,000

FIELD OBSERVATIONSWATER POLLUTION SURVEY

SHEET: A

TOWNSHIP OF SANDWICH WEST

MAY 1973

Sampling Point	Description of Sampling Point	Size of Outfall (Inches)	Kind of Outfall	Estimated Flow	Observations	Action	Day and Time of Sampling	Weather during Survey
93	Bouffard Road north ditch 2000 ft. west of Malden Road	-	Open ditch	No visible flow	Grey-black colour	ba	May 2 2:15 PM	Cloudy Dry
94	Bouffard Road south ditch 1000 ft. west of Malden Road	-	Open ditch	No visible flow	Grey-black colour	ch/ba	May 2 2:30 PM	Cloudy Dry
95	Bouffard Road at Matchette Road	-	-	-	House construction Recent completion	Photo #22	May 2 2:45 PM	Cloudy Dry
96	Laurier Drive 1000 ft. east of Matchette Road	-	-	-	House construction 1 - framing 1 - foundation	Photo #23	May 2 3:10 PM	Cloudy Dry
97	Laurier Drive at Malden Road	-	-	-	House construction 1 - Finishing	Photo #24	May 2 3:30 PM	Cloudy Dry
98	Golfview Drive - east outfall to Chappus rain behind North houses	-	Clay tile	3/4 gpm	Grey-black colour Sewage fungus noted	ch/ba	May 2 3:45 PM	Cloudy Dry
99	Golfview Drive - south ditch - west drain to Chappus Drain	18"	Steel	2 - 3gpm	Suspended grey matter noted in flow	ba	May 2 3:55 PM	Cloudy Dry

ANALYSES RESULTS

WATER POLLUTION SURVEY

SHEET: B

TOWNSHIP OF SANDWICH WEST

Sampling Point	Description of Sampling Point	5-Day BOD (ppm)	Susp. Solids (ppm)	Total Kjeldahl (ppm)	Total Phosphorus (ppm)	Faecal Coliform Count per 100 ml.	MF Coliform Count per 100 ml.
93	Bouffard Road - north ditch 2000 ft. west of Malden Road					80,000	32,000,000
94	Bouffard Road - south ditch 1000 ft. west of Malden Road	95	- Interference	7.0	2.6	2,200	8,000,000
95	Bouffard Road at Matchette Rd.						
96	Laurier Drive 1000 ft. east of Matchette Road						
97	Laurier Drive at Malden Road						
98	Golfview Drive - east outfall to Chappus Drain behind north houses	110	60	13	3.5	16,000	100,000,000
99	Golfview Drive - south ditch west drain to Chappus drain					3,200	280,000

FIELD OBSERVATIONSWATER POLLUTION SURVEY

SHEET: A

TOWNSHIP OF SANDWICH WEST

MAY 1973

Sampling Point	Description of Sampling Point	Size of Outfall (Inches)	Kind of Outfall	Estimated Flow	Observations	Action	Day and Time of Sampling	Weather during Survey
100	Golfview Drive at Tanglewood	-	-	-	House construction 1 - framing complete	Photo #25	May 2 4:10 PM	Cloudy Dry
101	Victoria Drive - 2500 ft. east of Hwy. #18	-	-	-	House construction 2 - foundations	-	May 2 4:25 PM	Cloudy Dry
102	Malden Road at Martin Lane	-	-	-	House construction 8 - various stages	Photo #26	May 2 4:40 PM	Cloudy Dry
103 A	Bessett Drain at Malden Road Crossing	-	Open ditch	No estimate	Grey-black colour Sludge in ditch Sewage fungus	ch/ba	May 2 4:55 PM	Cloudy Dry
103 B	Malden Road 500 ft. north of Kelly Road	-	-	-	House construction	Noted	May 2 5:10 PM	Cloudy Dry
104	Mayfair Avenue - west ditch at Reaume	-	Open ditch	1 - 2 gpm	Sewage fungus and scum noted	ch/ba	May 3 5:25 PM	Cloudy Dry
105	Reaume Avenue near Carnegie Avenue	-	-	-	House construction 1 - framing 1 - foundation	Noted	May 3 5:45 PM	Cloudy Dry

ANALYSES RESULTSWATER POLLUTION SURVEY

SHEET: B

TOWNSHIP OF SANDWICH WEST

Sampling Point	Description of Sampling Point	5-Day BOD (ppm)	Susp. Solids (ppm)	Total Kjeldahl (ppm)	Total Phosphorus (ppm)	Faecal Coliform Count per 100 ml.	MF Coliform Count per 100 ml.
100	Golfview Drive at Tanglewood						
101	Victoria Drive 2500 ft. east of Hwy. #18						
102	Malden Road at Martin Lane						
103 A	Bessett Drain at Malden Road Crossing	42	180	24	6.6	76,000	1,600,000
103 B	Malden Road 500 ft. north of Kelly Road						
104	Mayfair Avenue - west ditch at Reaume					1,000	1,300,000
105	Reaume Avenue near Carnegie Avenue						102.

FIELD OBSERVATIONSWATER POLLUTION SURVEY

SHEET: A

TOWNSHIP OF SANDWICH WEST

MAY 1973

Sampling Point	Description of Sampling Point	Size of Outfall (Inches)	Kind of Outfall	Estimated Flow	Observations	Action	Day and Time of Sampling	Weather during Survey
106	Reaume Avenue - 2000 ft. east of Front Road	-	-	-	House construction 1 - foundation	Noted	May 3 6:10 PM	Cloudy Dry
107	Front Road - east ditch just north of Turkey Creek	-	Open ditch	5 - 7 gpm	Sewage fungus noted	ch/ba	May 3 8:45 AM	Cloudy Dry
108	Front Road - near River Avenue	-	-	-	House construction 1 - foundation	Noted	May 3 9:05 AM	Cloudy Dry
109	River Avenue - just west of Main Street	-	-	-	House construction 1 - foundation	Noted	May 3 9:15 AM	Cloudy Dry
110	Major Blvd. 700 ft. west of Front Road	-	-	-	House construction 1 - finishing	Noted	May 3 9:30 AM	Cloudy Dry
111	Major Blvd. at Channel	-	-	-	House construction 1 - recent completion	Noted	May 3 9:40 AM	Cloudy Dry
112	Vermont Street - south ditch 1000 ft. east of Front Road	-	Open ditch	1 gpm	Sewage odour	ba	May 3 10:05 AM	Cloudy Dry

ANALYSES RESULTSWATER POLLUTION SURVEY

SHEET: B

TOWNSHIP OF SANDWICH WEST

Sampling Point	Description of Sampling Point	5-Day BOD (ppm)	Susp. Solids (ppm)	Total Kjeldahl (ppm)	Total Phosphorus (ppm)	Faecal Coliform Count per 100 ml.	MF Coliform Count per 100 ml.
106	Reaume Avenue 2000 ft. east of Front Road						
107	Front Road - east ditch just north of Turkey Creek	G 78	70	15	10	42,000	24,000,000
108	Front Road - near River Avenue						
109	River Avenue - just west of Main Street						
110	Major Blvd. 700 ft. west of Front Road						
111	Major Blvd. at Channel						
112	Vermont Street - south ditch 1000 ft. east of Front Road					300,000	2,700,000

FIELD OBSERVATIONSWATER POLLUTION SURVEY

SHEET: A

TOWNSHIP OF SANDWICH WEST

MAY 1973

Sampling Point	Description of Sampling Point	Size of Outfall (Inches)	Kind of Outfall	Estimated Flow	Observations	Action	Day and Time of Sampling	Weather during Survey
113	Elsworth Avenue ditch behind north houses 1000 ft. east of Front Road	-	Open ditch	No estimate	Septic tank overflows noted along ditch	ba	May 3 10:15 AM	Cloudy Dry
114	Elsworth Avenue ditch behind north houses at Front Road	-	Open ditch	No estimate	Septic tank overflows noted along ditch	ch/ba	May 3 10:20 AM	Cloudy Dry
115	Front Road at Ulster Street	-	-	-	Apartment construction 12 - units	Photo #27	May 3 10:25 AM	Cloudy Dry
116	Bouffard Road - south ditch 1000 ft. east of Front Road	-	Open ditch	1 gpm	Grey-black colour Strong sewage odour	ch/ba Photo #28	May 3 10:55 AM	Cloudy Dry
117	Bouffard Road near Carnegie Street	-	-	-	House construction 1 - framing	Noted	May 3 11:10 AM	Cloudy Dry
118	Bouffard Road near Carnegie Street	-	-	No flow	Grey-black colour	ba	May 3 11:20 AM	Cloudy Dry

ANALYSES RESULTSWATER POLLUTION SURVEY

SHEET: B

TOWNSHIP OF SANDWICH WEST

Sampling Point	Description of Sampling Point	5-Day BOD (ppm)	Susp. Solids (ppm)	Total Kjeldahl (ppm)	Total Phosphorus (ppm)	Faecal Coliform Count per 100 ml.	MF Coliform Count per 100 ml.
113	Elsworth Avenue ditch behind north houses 1000 ft. east of Front Road					12,000	1,180,000
114	Elsworth Avenue ditch behind north houses at Front Road	5.5	10	1.0	0.9	400	6,000
115	Front Road at Ulster Street						
116	Bouffard Road - south ditch 1000 ft. east of Front Road	460	870	124	18	120,000	16,000,000
117	Bouffard Road near Carnegie Street						
118	Bouffard Road near Carnegie Street					160,000	9,000,000

FIELD OBSERVATIONSWATER POLLUTION SURVEY

SHEET: A

TOWNSHIP OF SANDWICH WEST

MAY 1973

Sampling Point	Description of Sampling Point	Size of Outfall (Inches)	Kind of Outfall	Estimated Flow	Observations	Action	Day and Time of Sampling	Weather during Survey
119	Bouffard Road 1000 ft. west of Railway tracks	-	-	-	House construction 1 - foundation	Noted	May 3 11:45 AM	Cloudy Dry
120	Laurier Drive	-	-	-	House construction 1 - framing	Noted	May 3 12:05 PM	Cloudy Dry
121	Catch basin - north-east corner Delaware and Front Road	-	Catch basin	No visible flow	Grey-black colour	ch/ba	May 3 12:55 PM	Cloudy Dry
122	Catch basin - north-east corner Sacred Heart Drive and Front Road	-	Catch basin	No visible flow	Grey-black colour	ch/ba	May 3 1:15 PM	Cloudy Dry
123	Delaware Avenue at Michigan Avenue	-	-	-	House construction 1 - framing	Noted	May 3 1:20 PM	Cloudy Dry
124	Catch basin - Victory Drive and Hwy. #18	-	Catch basin	No visible flow	Grey-black colour	ch/ba	May 3 2:20 PM	Cloudy Dry
125	Victory Drive ditch behind Apt. Bldgs. 300 ft. east of Railway	-	Open ditch	No visible flow	Grey-black colour Very strong sewage odour	ch/ba	May 3 2:35 PM	Cloudy Dry

ANALYSES RESULTSWATER POLLUTION SURVEY

SHEET: B

TOWNSHIP OF SANDWICH WEST

Sampling Point	Description of Sampling Point	5-Day BOD (ppm)	Susp. Solids (ppm)	Total Kjeldahl (ppm)	Total Phosphorus (ppm)	Faecal Coliform Count per 100 ml.	MF Coliform Count per 100 ml.
119	Bouffard Road 1000 ft. west of Railway Tracks						
120	Laurier Drive						
121	Catch basin -north-east corner Delaware and Front Road	140	80	16	18	160,000	2,500,000
122	Catch basin - north-east corner Sacred Heart Drive and Front Rd.	100	40	19	2.6	60,000	11,000,000
123	Delaware Ave. at Michigan Ave.						
124	Catch basin Victory Drive and Hwy. #18	6.0	10	2.4	0.8	5,000	130,000
125	Victory Drive ditch behind Apt. Bldgs. 300 ft. east of Railway	95	70	29	6.5	26,000	1,100,000

FIELD OBSERVATIONSWATER POLLUTION SURVEY

SHEET: A

TOWNSHIP OF SANDWICH WEST

MAY 1973

Sampling Point	Description of Sampling Point	Size of Outfall (Inches)	Kind of Outfall	Estimated Flow	Observations	Action	Day and Time of Sampling	Weather during Survey
126	Malden Road	-	-	-	House construction 1 - framing	Noted	May 3 6:20 PM	Cloudy Dry
127	Disputed Road 1000 ft. south of Kelly Road	-	-	-	House construction 1 - finishing	Noted	May 3 6:35 PM	Cloudy Dry
128	Disputed Road overflow to east ditch near golf course	4"	Clay tile	1/4 gpm	Septic tank overflow Grey coloured effluent	ch/ba	May 3 6:50 PM	Cloudy Dry
129	Bouffard Road 1000 ft. west of Disputed Road	-	-	-	House construction 1 - framing	-	May 4 12:05 PM	Cloudy Dry
130	Bouffard Road						May 4 12:15 PM	Cloudy Dry
131	Bouffard Road -south ditch	-	Open ditch	1 gpm	Milky white colour	ch/ba	May 4 12:20 PM	Cloudy Dry

ANALYSES RESULTSWATER POLLUTION SURVEY

SHEET: B

TOWNSHIP OF SANDWICH WEST

Sampling Point	Description of Sampling Point	5-Day BOD (ppm)	Susp. Solids (ppm)	Total Kjeldahl (ppm)	Total Phosphorus (ppm)	Faecal Coliform Count per 100 ml.	MF Coliform Count per 100 ml.
126	Malden Road						
127	Disputed Road 1000 ft. south of Kelly Road						
128	Disputed Road overflow to east ditch near golf course	85	10	22	5.5	8,000	2,200,000
129	Bouffard Road 1000 ft. west of Disputed Road						
130	Bouffard Road						
131	Bouffard Road - south ditch	13	5	2.8	2.3	14,000	12,700,000

A P P E N D I X I I I

PHOTOGRAPHS

TOWNSHIP OF SANDWICH WEST
WATER POLLUTION SURVEY

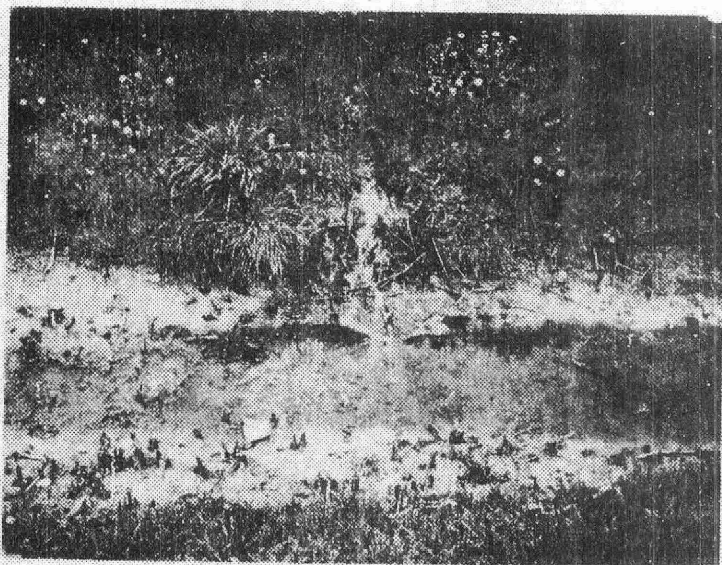


PHOTO # 1

LOCATION POINT # 49

NORTH TOWNLINE ROAD - NORTH DITCH

1000 FT WEST OF CTY RD # 9

NOTE: SEPTIC TANK OVERFLOW

B.O.D.₅ - 34 MG/L

S.S. - 50 MG/L

T. KJEL - 27 MG/L

T. PHOS - 3.3 MG/L

FECAL COLI - 1,600 / 100 ML

TOTAL COLI - 25,000 / 100 ML

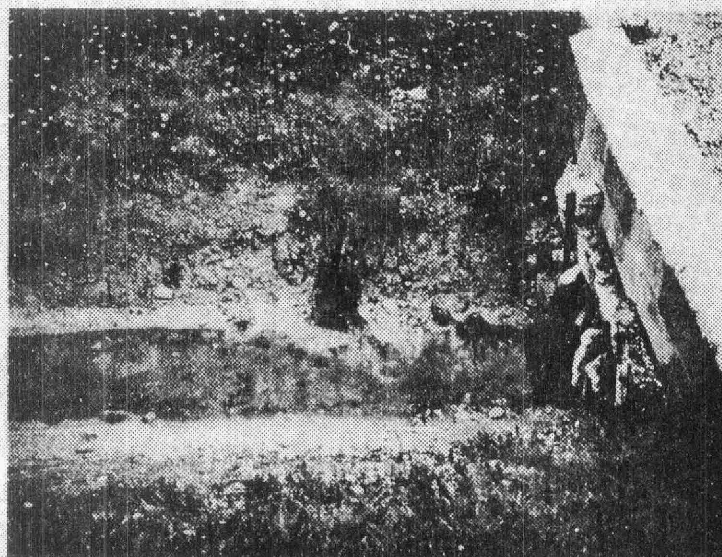
PHOTO # 2

LOCATION POINT # 50

NORTH TOWNLINE ROAD - NORTH DITCH

1200 FT WEST OF CTY RD #9

NOTE: SEPTIC TANK OVERFLOW



TOWNSHIP OF SANDWICH WEST
WATER POLLUTION SURVEY



PHOTO # 3

LOCATION POINT # 52

NORTH TOWNLINE ROAD - NORTH DITCH

1500 FT EAST OF BRODERICK ROAD

NOTE: DISCOLORATION

FECAL COLI - 40 / 100 ML

TOTAL COLI - 400,000 / 100 ML

PHOTO # 4

LOCATION POINT # 57

BRODERICK ROAD - EAST DITCH

1200 FT NORTH OF LAFRAMBOISE DRAIN

NOTE: SEPTIC TANK OVERFLOW

FECAL COLI - 700,000 / 100 ML

TOTAL COLI - 170,000,000 / 100 ML



TOWNSHIP OF SANDWICH WEST
WATER POLLUTION SURVEY

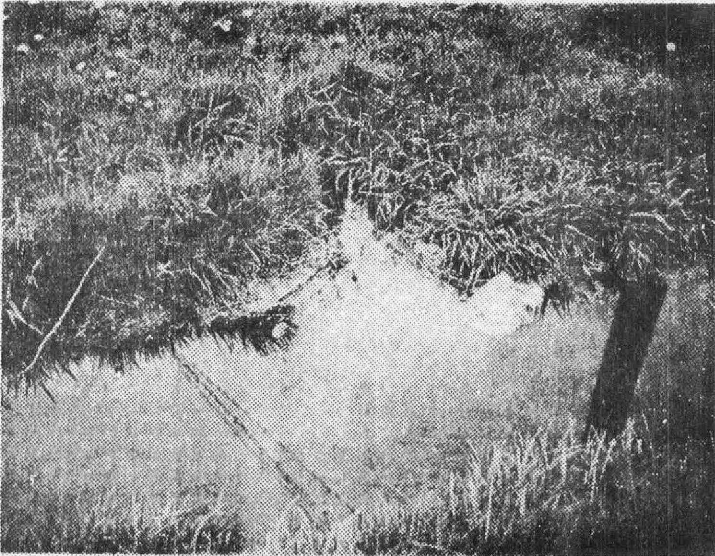


PHOTO # 5

LOCATION POINT # 62

BRODERICK ROAD - WEST DITCH

1100 FT SOUTH OF KELLY ROAD

NOTE: SEPTIC TANK OVERFLOW

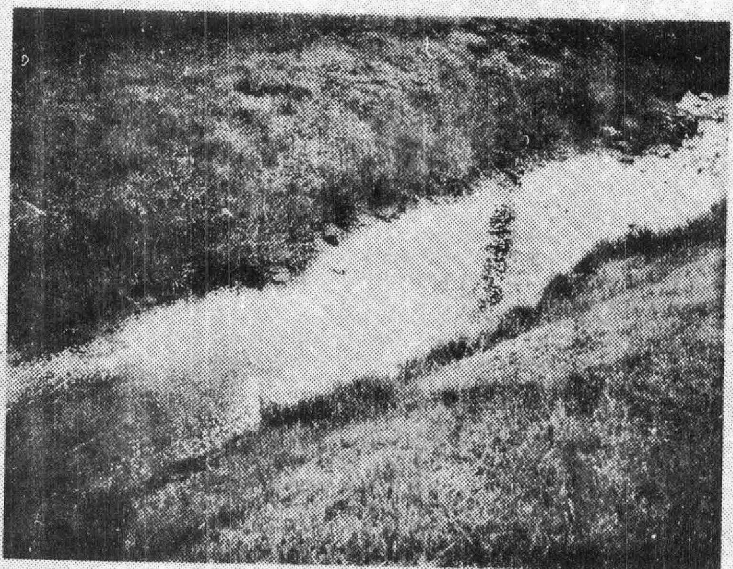


PHOTO # 6

LOCATION POINT # 65

BRODERICK ROAD - WEST DITCH

300 FT NORTH OF KELLY ROAD

NOTE: FOAM AND SCUM

TOWNSHIP OF SANDWICH WEST
WATER POLLUTION SURVEY

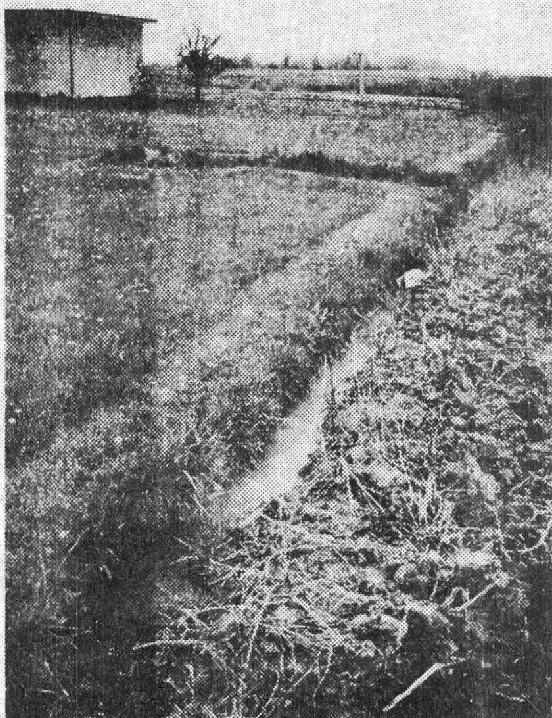


PHOTO # 7

LOCATION POINT # 67

BRODERICK ROAD

CHANNEL TO WEST DITCH

NOTE: COLOUR OF DITCH

FECAL COLI - 1,600,000 / 100 ML

TOTAL COLI - 290,000,000 / 100 ML

PHOTO # 8

LOCATION POINT # 68

BRODERICK ROAD -

AT TAYLOR GUNN DRAIN

NOTE: SEPTIC TANK OVERFLOW

B.O.D.₅ - 22 MG/L

FECAL COLI - 700 / 100 ML

TOTAL COLI - 15,000 / 100 ML



TOWNSHIP OF SANDWICH WEST

WATER POLLUTION SURVEY

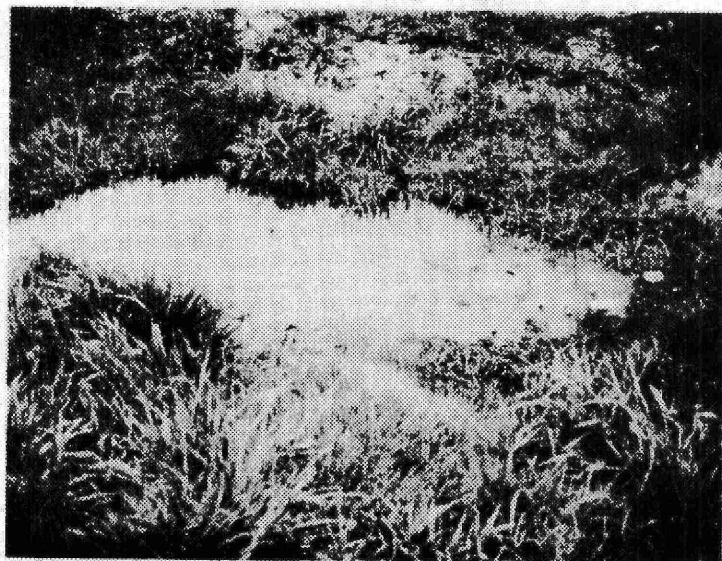


PHOTO # 9

LOCATION POINT # 71

BRODERICK ROAD - EAST DITCH

1500 FT SOUTH OF 3RD CONS. DRAIN

NOTE: DISCOLORATION

B.O.D.₅ - 60 MG/L

FECAL COLI - 700 / 100 ML

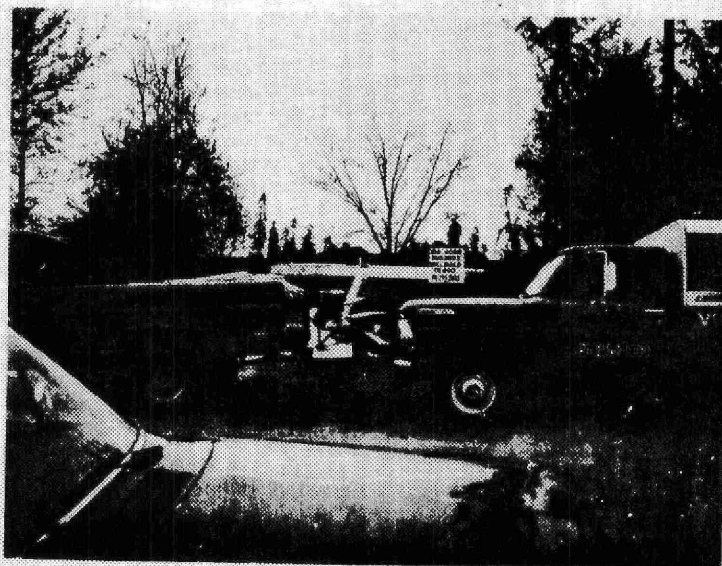
TOTAL COLI - 140,000,000 / 100 ML

PHOTO # 10

LOCATION POINT # 72

MONTGOMERY ROAD - AT CROYDON RD

NOTE: HOUSE CONSTRUCTION



TOWNSHIP OF SANDWICH WEST
WATER POLLUTION SURVEY



PHOTO # 11

LOCATION POINT # 73

LEPAIN DRAIN AT MONTGOMERY ROAD

NOTE: DISCOLORATION AND SEWAGE FUNGUS

B.O.D.₅ - 65 MG/L

FECAL COLI - 1,000,000 / 100 ML

TOTAL COLI - 17,000,000 / 100 ML

PHOTO # 12

LOCATION POINT # 73

LEPAIN DRAIN AT MONTGOMERY ROAD

NOTE: DISCOLORATION AND SEWAGE FUNGUS



TOWNSHIP OF SANDWICH WEST
WATER POLLUTION SURVEY

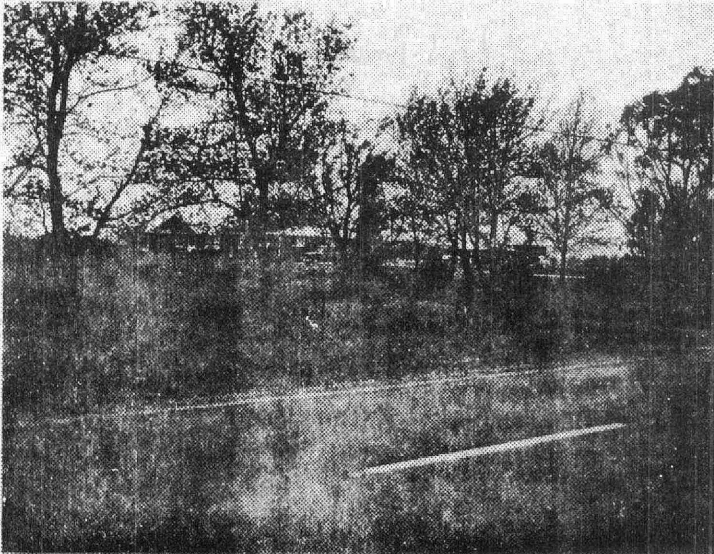
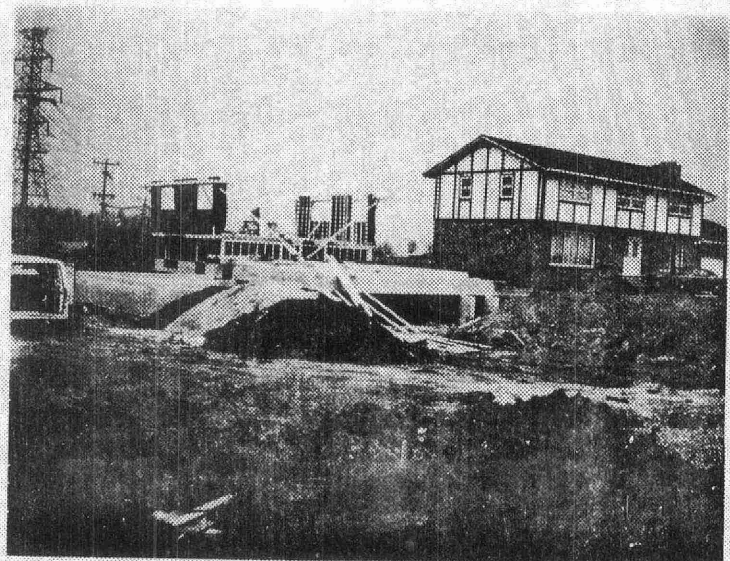


PHOTO # 13
LOCATION POINT # 74
HURON CHURCH LINE RD AT CABOT DRIVE
NOTE: RECENT HOUSE CONSTRUCTION

PHOTO # 14
LOCATION POINT # 75
HURON CHURCH LINE ROAD
500 FT NORTH OF 6TH CONS. RD.
NOTE: HOUSE CONSTRUCTION



TOWNSHIP OF SANDWICH WEST
WATER POLLUTION SURVEY



PHOTO # 15

LOCATION POINT # 76

COUSINEAU ROAD - NORTH DITCH

AT DAYTONA ST.

NOTE: DISCOLORATION

B.O.D.₅ - 130 MG/L

S.S. - 150 MG/L

T.KJEL - 46 MG/L

T.PHOS - 16 MG/L

FECAL COLI - 610,000 / 100 ML

TOTAL COLI - 2,300,000 / 100 ML

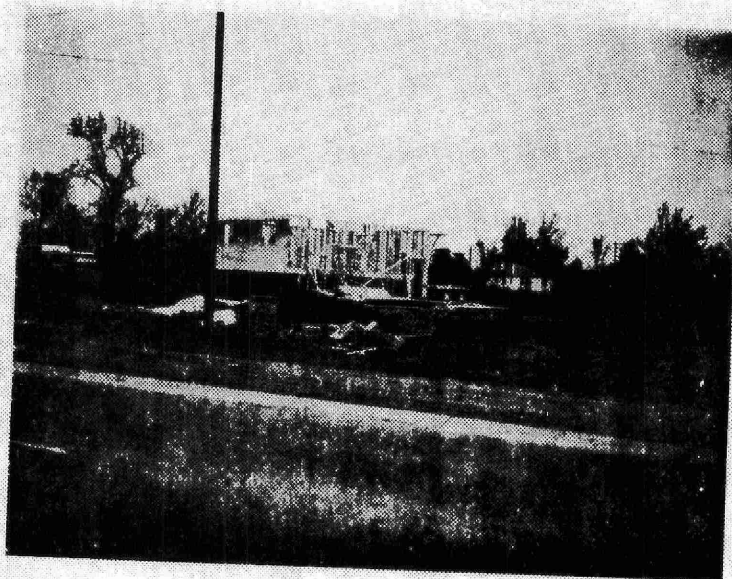
PHOTO # 16

LOCATION POINT # 79

HURON CHURCH LINE ROAD

NEAR BROOKLYN AVE.

NOTE: HOUSE CONSTRUCTION



TOWNSHIP OF SANDWICH WEST
WATER POLLUTION SURVEY

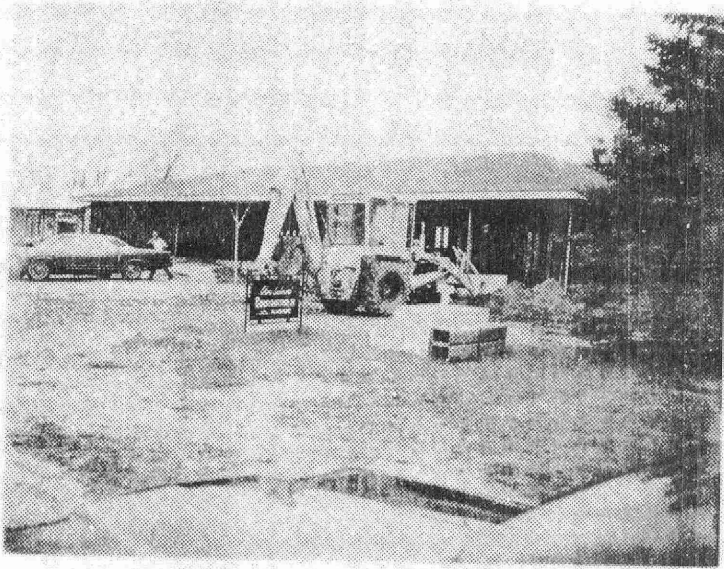


PHOTO # 17

LOCATION POINT # 83

TODD LANE

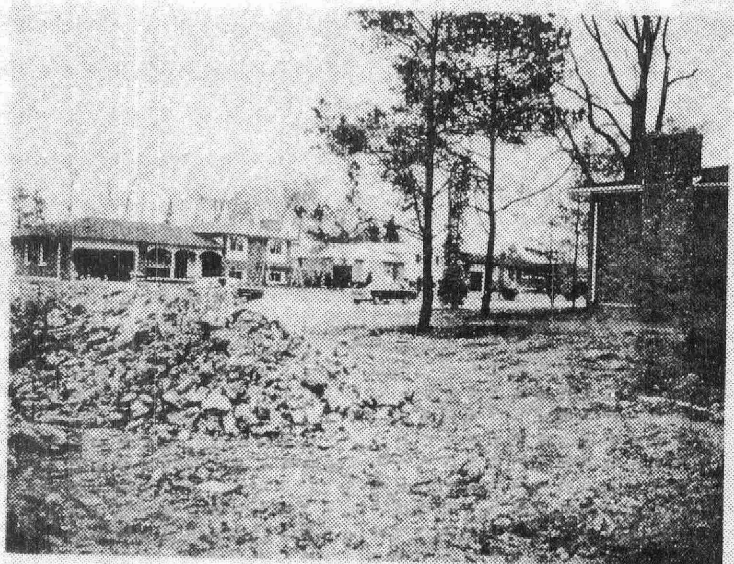
NOTE: HOUSE CONSTRUCTION

PHOTO # 18

LOCATION POINT # 84

HASTINGS DRIVE - SOUTHERLY EXTENT

NOTE: HOUSE CONSTRUCTION



TOWNSHIP OF SANDWICH WEST

WATER POLLUTION SURVEY

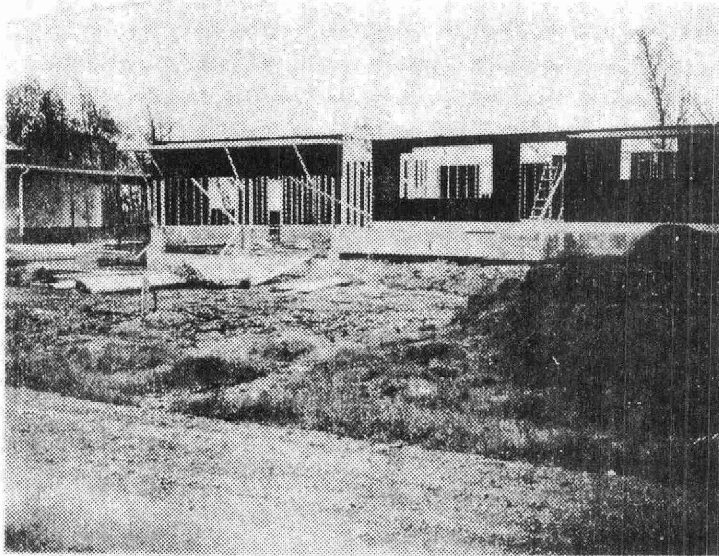


PHOTO # 19

LOCATION POINT # 86

SUZANNE STREET

NOTE: HOUSE CONSTRUCTION

PHOTO # 20

LOCATION POINT # 87

STUART BLVD - SOUTH DITCH

NOTE: DISCOLORATION

B.O.D.₅ - 3,400 MG/L

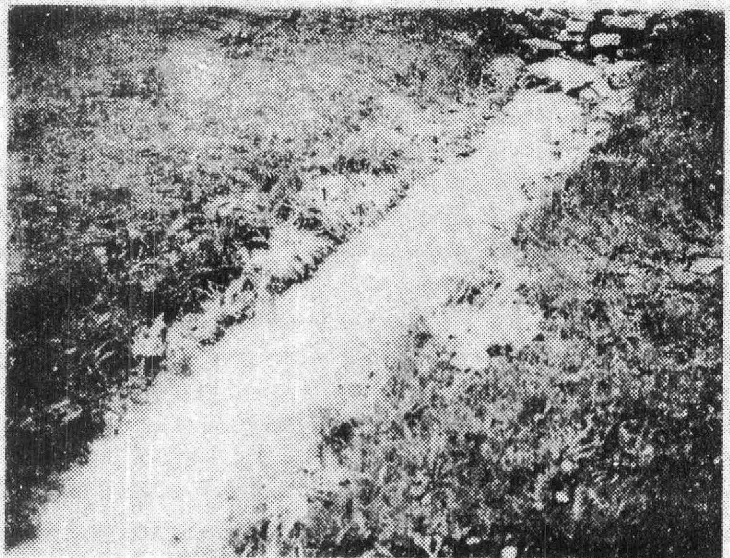
S.S. - 3,300 MG/L

T.KJEL - 28 MG/L

T.PHOS - 0.7 MG/L

FECAL COLI - 1,200 / 100 ML

TOTAL COLI - 430,000 / 100 ML



TOWNSHIP OF SANDWICH WEST

WATER POLLUTION SURVEY

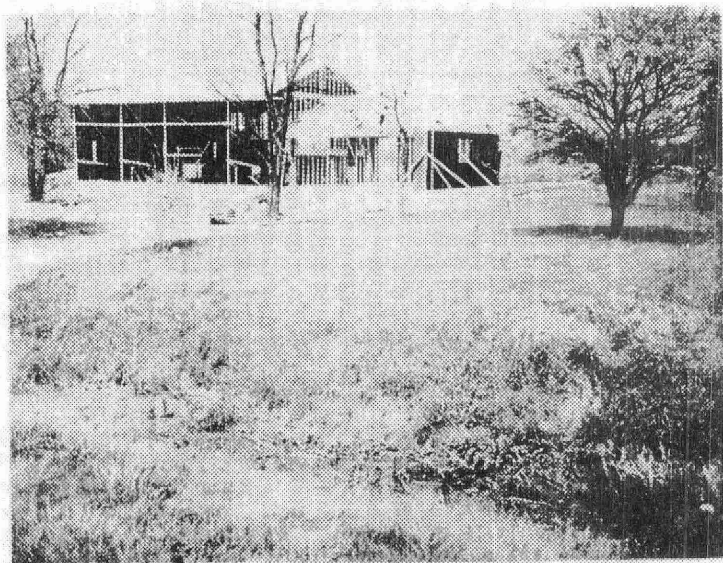


PHOTO # 21

LOCATION POINT: # 89

REAUME AVENUE

1000 FT EAST OF MATCHETTE ROAD

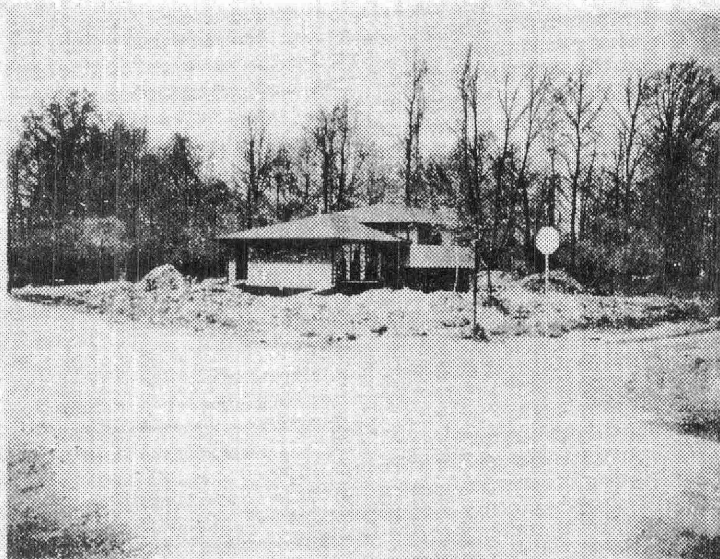
NOTE: HOUSE CONSTRUCTION

PHOTO # 22

LOCATION POINT # 95

BOUFFARD ROAD AT MATCHETTE ROAD

NOTE: RECENT HOUSE CONSTRUCTION



TOWNSHIP OF SANDWICH WEST
WATER POLLUTION SURVEY

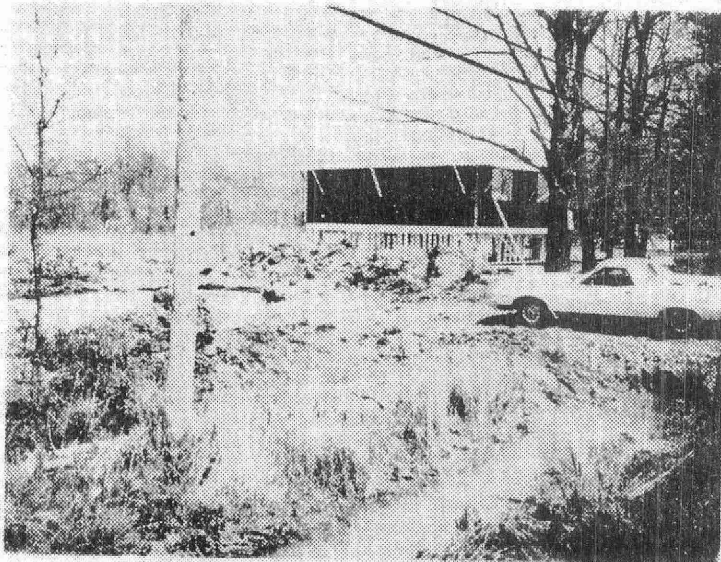


PHOTO # 23

LOCATION POINT # 96

LAURIER DRIVE

1000 FT EAST OF MATCHETTE ROAD

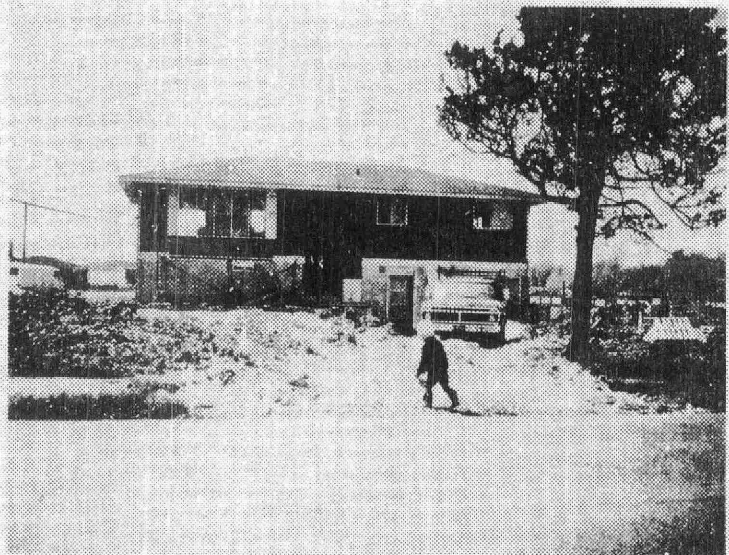
NOTE: HOUSE CONSTRUCTION

PHOTO # 24

LOCATION POINT # 97

LAURIER DRIVE AT MALDEN ROAD

NOTE: HOUSE CONSTRUCTION



TOWNSHIP OF SANDWICH WEST
WATER POLLUTION SURVEY

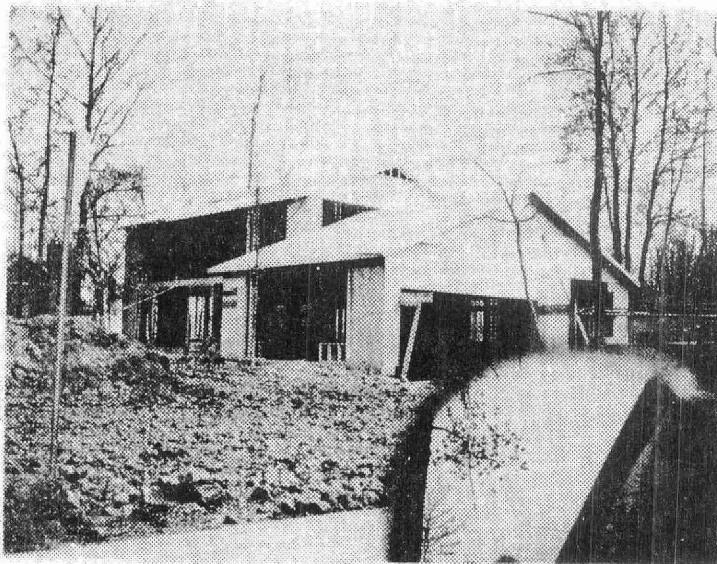
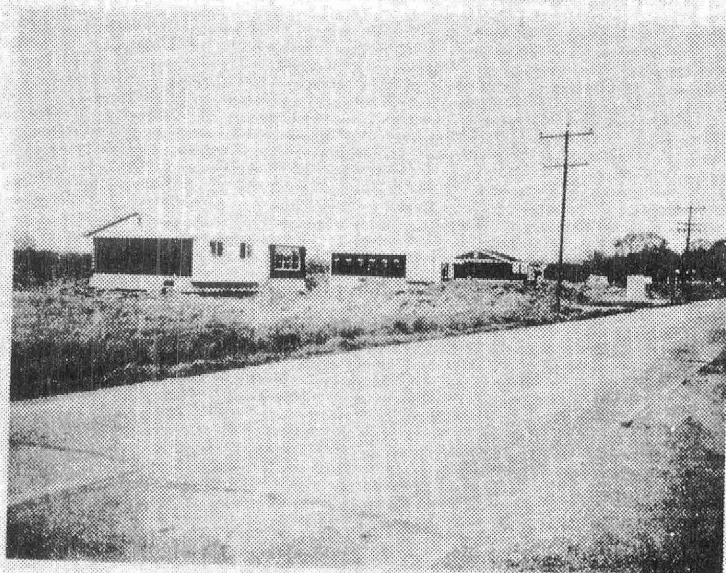


PHOTO # 25
LOCATION POINT # 100
GOLFVIEW DRIVE AT TANGLEWOOD
NOTE: HOUSE CONSTRUCTION

PHOTO # 26
LOCATION POINT # 102
MALDEN ROAD AT AMRTIN LANE
NOTE: HOUSE CONSTRUCTION
8 HOUSES IN STRIP FORM



TOWNSHIP OF SANDWICH WEST
WATER POLLUTION SURVEY

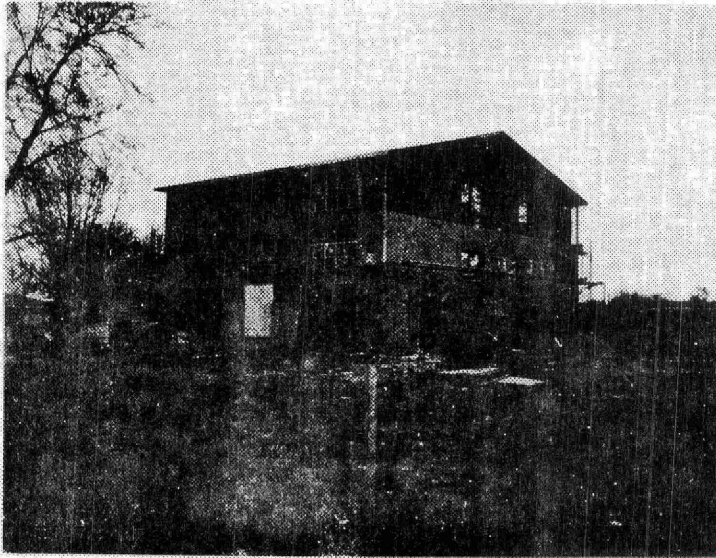


PHOTO # 27

LOCATION POINT # 115

FRONT ROAD AT ULSTER STREET

NOTE: APARTMENT BLDG CONSTRUCTION
12 UNITS

PHOTO # 28

LOCATION POINT # 116

BOUFFARD ROAD - SOUTH DITCH

1000 FT EAST OF FRONT ROAD

NOTE: DISCOLORATION AND DEPOSITS

B.O.D.₅ - 460 MG/L

S.S. - 870 MG/L

T.KJEL - 124 MG/L

T.PHOS - 18 MG/L

FECAL COLI - 120,000 / 100 ML

TOTAL COLI - 16,000,000 / 100 ML

